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Oceans and the law of the sea

Oceans and the law of the sea

Report of the Secretary-General

Addendum

Summary

The present report has been prepared pursuant to paragraph 240 of General Assembly resolution 65/37 of 7 December 2010, requesting the Secretary-General to present, for consideration by the Assembly at its sixty-sixth session, a comprehensive report on developments and issues relating to oceans and the law of the sea. The report is aimed at facilitating discussions on the topic of focus at the twelfth meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea, on the theme entitled "Contributing to the assessment, in the context of the United Nations Conference on Sustainable Development, of progress to date and the remaining gaps in the implementation of the outcomes of the major summits on sustainable development and addressing new and emerging challenges". It constitutes the second part of the comprehensive report of the Secretary-General and is also being submitted to States Parties to the United Nations Convention on the Law of the Sea, pursuant to article 319 of the Convention.

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Abbreviations

CARICOM	Caribbean Community
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
IAEA	International Atomic Energy Agency
ICSU	International Council for Science
IHO	International Hydrographic Organization
ILO	International Labour Organization
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission of UNESCO
MARPOL 73/78	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto
NEPAD	New Economic Partnership for Africa's Development
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UN-Oceans	United Nations Oceans and Coastal Areas network
WMO	World Meteorological Organization
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

I. Introduction

1. Pursuant to the request of the General Assembly in its resolution 65/37, the present report is being submitted to the sixty-sixth session of the General Assembly, the twelfth meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (the Informal Consultative Process), as well as to the twenty-first meeting of States parties to the United Nations Convention on the Law of the Sea.

2. In paragraph 231 of its resolution 65/37, the General Assembly decided that the Informal Consultative Process would focus its discussions at its twelfth meeting on contributing to the assessment, in the context of the United Nations Conference on Sustainable Development, of progress to date and the remaining gaps in the implementation of the outcomes of the major summits on sustainable development and addressing new and emerging challenges. The present report addresses that topic.

3. The report benefited from the contributions of intergovernmental organizations and other bodies engaged in activities relating to ocean affairs and the law of the sea. The Secretary-General wishes to express his appreciation to the following organizations and bodies for their responses received as at 30 March 2011: the Intergovernmental Oceanographic Commission of UNESCO; the International Maritime Organization; the International Seabed Authority; the Islamic Development Bank; the Food and Agriculture Organization of the United Nations; the International Hydrographic Organization; the United Nations Environment Programme; Secretariat of the United Nations Framework Convention on Climate Change; Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; the secretariats of the Commission for the Conservation of Antarctic Marine Living Resources; the Inter-American Tropical Tuna Commission; the International Commission for the Conservation of Atlantic Tunas and the North East Atlantic Fisheries Commission; the Departments of Economic and Social Affairs and Political Affairs of the Secretariat; and the United Nations Office on Drugs and Crime.[1]

4. Also relevant to the consideration of the topic of focus are previous reports for meetings of the Informal Consultative Process and past reports of the Secretary-General on oceans and the law of the sea, which provide information on developments related to ocean affairs and law of the sea issues, including the implementation of the United Nations Convention on the Law of the Sea (the Convention) and its implementing Agreements.[2]

5. Section II of the present report explains the relationship between the oceans and seas and sustainable development and describes the relevant provisions of outcomes of the major summits on sustainable development. Section III provides an overview of the achievements and progress to date in the implementation of those outcomes, on a sectoral basis. Section IV addresses some of the remaining gaps in implementation and highlights challenges and emerging issues. Section V sets out conclusions.

[1] The Division for Sustainable Development of the Department for Economic and Social Affairs also contributed to the substantive preparation of relevant sections of this report.

[2] See www.un.org/Depts/los/general_assembly/general_assembly_reports.htm.

II. Oceans and seas and sustainable development

6. In the Earth's wheel of life, the oceans provide balance.[1] They constitute the major part of the planet that supports life, drive the climate and hydrological cycle and provide vital resources.[2] Oceans, seas, islands and coastal areas form an integrated and essential component of the Earth's ecosystem and are critical for global food security and for sustaining economic prosperity and the well-being of many national economies, particularly in developing countries.[3] The sustainable development and use of the oceans and their resources are essential to the achievement of the three pillars of sustainable development: economic development, social development and environmental protection.

7. The development of a "green economy" capable of fostering economic growth and poverty alleviation while promoting social development and ensuring environmental protection depends on the sustainable development and use of the oceans and their resources. It is therefore important to view the fundamental need to protect our oceans and their resources for future generations in the broader context of sustainable development.

8. In the 1987 report entitled "Our Common Future" (A/42/427, annex), the World Commission on Environment and Development noted that sustainable development, if not survival itself, depends on significant advances in the management of the oceans. After recognizing that the advancement of the law of the sea was an urgently needed measure, the Commission observed that the most significant initial action that nations can take in the interests of the oceans' threatened life-support system is to ratify the Law of the Sea Convention.

9. The oceans have remained an important part of the sustainable development agenda thereafter. Key commitments with regard to the sustainable development and use of the oceans were agreed as part of the outcomes of the major summits on sustainable development. They are, in particular, the 1992 United Nations Conference on Environment and Development, the nineteenth special session of the General Assembly on the programme for the further implementation of Agenda 21 (see sect. II-B, below), the 2000 Millennium Summit of the United Nations, the 2002 World Summit on Sustainable Development and the 2010 High-level Plenary Meeting of the General Assembly on the Millennium Development Goals.

10. With the approach of the United Nations Conference on Sustainable Development, to be held in Brazil from 4 to 6 June 2012, and the review by the Commission on Sustainable Development of the thematic cluster on oceans and seas in 2014, it is opportune to take stock of the progress achieved and the remaining gaps, challenges and emerging issues with the view to identifying a way forward.

[1] A/42/427.
[2] United Nations Commission on Sustainable Development, seventh session, decision 7/1.
[3] Johannesburg Plan of Implementation (see note 9 below), para. 30.

A. 1992 United Nations Conference on Environment and Development

1. Background

11. Twenty years after the 1972 United Nations Conference on the Human Environment, the United Nations Conference on Environment and Development was convened in Rio de Janeiro, Brazil from 3 to 14 June 1992 to rethink economic development and find ways to halt the destruction of the Earth's natural resources and ecosystems. Governments recognized the need to refocus international and national strategies and policies to better integrate the three pillars of sustainable development.

12. The "Earth Summit", as it is commonly referred to, concluded with the adoption of the Rio Declaration and Agenda 21, which defined the global strategy to achieve sustainable development. Agenda 21 remains the most comprehensive and effective programme of action ever launched by the international community to preserve the rights of future generations.

2. Rio Declaration on Environment and Development

13. At the Earth Summit, Governments adopted a declaration with a set of principles to guide sustainable development.[6] These principles build on the Stockholm Declaration adopted at the 1972 United Nations Conference on the Human Environment and recognize that the only way to have long-term economic progress is to link it with environmental and social protection. The Rio Declaration[7] emphasizes that people are entitled to a healthy and productive life in harmony with nature (Principle 1), so long as development does not undermine the developmental and environmental needs of present and future generations (Principle 3). States have the right to exploit their own resources and the responsibility to ensure that no environmental damage occurs beyond the limits of national jurisdiction (Principle 2).

14. The need for a precautionary approach to protect the environment was also acknowledged (Principle 15). Where there are threats of serious or irreversible damage, that approach should prevail. Environmental protection and poverty eradication were considered to constitute an integral part of the development process.

15. The role of international cooperation was recalled as important in order to conserve, protect and restore the health and integrity of the Earth's ecosystem. States were encouraged to share knowledge and innovative technologies to achieve the goal of sustainability and invited to reduce and eliminate unsustainable patterns of production and consumption.

16. The importance of effective environmental laws and the development of national law regarding liability for the victims of pollution and other environmental damage was recognized (Principle 13). Those laws should not be used as an unjustifiable means of restricting international trade and should rely on the polluter-pays principle (Principle 16).

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[6] A/CONF.151/26 (Vol. I), annex I.

[7] Available from www.unep.org/Documents.Multilingual/Default.asp?DocumentID=78&ArticleID=1163&l=en.

3. Agenda 21 and chapter 17

Agenda 21

17. Agenda 21[8] sets out a comprehensive programme of action for sustainable development that addresses every area in which human activities may affect sustainable development, including oceans and seas. The Agenda is divided into four main sections: social and economic dimensions, such as combating poverty and changing consumption patterns; conservation and management of resources for development; strengthening the role of major groups; and means of implementation, including scientific and technological means, human resource development, capacity-building, technology transfer, international institutions and financial mechanisms.

Chapter 17

18. Chapter 17 of Agenda 21, entitled "Protection of the Oceans, all Kinds of Seas, Including Enclosed and Semi-enclosed Seas, and Coastal Areas and the Protection, Rational Use and Development of their Living Resources", is devoted to the marine environment as an essential component of life and sustainable development. It recalls that the protection and sustainable development of the marine and coastal environment is reflected in international law, including the provisions of the Convention, and require an integrated approach to marine and coastal area management and development. The chapter also identifies seven programme areas reflecting the fundamental programme of action for achieving sustainable development with respect to oceans and seas: (a) integrated management and sustainable development of coastal areas, including exclusive economic zones; (b) marine environmental protection; (c) sustainable use and conservation of marine living resources of the high seas; (d) sustainable use and conservation of marine living resources under national jurisdiction; (e) addressing critical uncertainties for the management of the marine environment and climate change; (f) strengthening international, including regional, cooperation and coordination; and (g) sustainable development of small islands.

19. For each of these programme areas, Agenda 21 set forth a basis for action, objectives, activities and the means of implementation. It noted that the protection and sustainable development of the marine and coastal environment and its resources would require new approaches to marine and coastal area management and development, at the national, subregional, regional and global levels, approaches that were integrated in content and were precautionary and anticipatory in ambit. It also highlighted, in its paragraph 17.2, that the implementation by developing countries of the activities would be commensurate with their individual technological and financial capacities and priorities in allocating resources for development needs and would ultimately depend on the technology transfer and financial resources required and made available to them.

20. Sections III and IV of the present report detail some of the specific commitments undertaken in chapter 17 and the efforts that have been undertaken to implement them.

[8] Available from www.un.org/esa/dsd/agenda21.

B. Nineteenth special session of the General Assembly

21. At its nineteenth special session, held from 23 to 27 June 1997, the General Assembly adopted the Programme for the Further Implementation of Agenda 21 (resolution S-19/2, annex). The programme was based on a review by Member States of progress achieved since the United Nations Conference on Environment and Development.

22. With reference to oceans and seas in paragraph 36 of the programme, the General Assembly highlighted the achievements in the negotiation of agreements and non-binding instruments regarding the conservation and management of fishery resources and the protection of the marine environment. Reference was made to the International Year of the Ocean in 1998 and Member States were encouraged to take full advantage of the opportunity and challenge it presented.

23. It was noted that improvements were needed regarding decision-making at the national, regional and global levels, as well as international cooperation to assist developing countries in implementing the relevant agreements and instruments.

24. Governments were encouraged to implement decision 4/15 of the Commission on Sustainable Development (E/CN.17/1996/38) on the protection of the atmosphere and protection of the oceans and all kinds of seas, which called for a periodic intergovernmental review of all aspects of the marine environment and its related issues, under the overall legal framework provided by the Convention. All States were encouraged to ratify or accede to relevant agreements and to implement General Assembly resolution 51/189 of 16 December 1996 on the "Institutional arrangements for the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities". There was an urgent need to reinforce institutional links between relevant intergovernmental mechanisms responsible for integrated coastal zone management. Furthermore, the importance of implementing existing international and regional agreements on marine pollution was highlighted in the context of the Convention and of Principle 13 of the Rio Declaration. Governments were urged to prevent or eliminate overfishing and excess fishing capacity and to ensure effective conservation and management of fish stocks, including through a cautious consideration of the use of subsidies. The importance of adequate scientific biological and fisheries data collection and dissemination was emphasized.

C. 2002 World Summit on Sustainable Development

Johannesburg Plan of Implementation

Introduction

25. Ways to better implement Agenda 21 and identify concrete steps and quantifiable targets to achieve sustainable development were further debated by Governments at the World Summit on Sustainable Development in 2002, which adopted the Johannesburg Plan of Implementation.[9] The Plan reiterated the

[9] *Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August-4 September 2002* (United Nations publication, Sales No. E.03.II.A.1 and corrigendum), chap. I, resolution 2, annex.

international community's commitment to the full implementation of Agenda 21, the Millennium Development Goals (see sect. II, D) and other relevant international agreements. It also sets out new commitments and priorities for action on sustainable development, and is divided into 11 chapters, each with its own specific focus. Cross-cutting issues are dealt with in most parts of the Plan, reflecting the fact that sustainable development requires a holistic approach.

Paragraphs 30-36 of the Johannesburg Plan of Implementation

26. Oceans, seas, islands and coastal areas form the core topic of paragraphs 30 to 36 of the Plan. They address, in particular: (a) enhancing effective coordination and cooperation, including at the global and regional levels, between relevant bodies; (b) achieving sustainable fisheries; (c) promoting conservation and management of the oceans; (d) advancing implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities and the Montreal Declaration on the Protection of the Marine Environment from Land-based Activities, with particular emphasis during the period from 2002 to 2006 on municipal wastewater, the physical alteration and destruction of habitats, and nutrients; (e) enhancing maritime safety and protection of the marine environment from pollution; (f) taking into account the potential for environmental and human health impacts of radioactive wastes; and (g) improving the scientific understanding and assessment of marine and coastal ecosystems as a fundamental basis for sound decision-making.

27. Sections III and IV of the present report detail some of the specific commitments undertaken in paragraphs 30 to 36 of the Johannesburg Plan of Implementation, as well as the efforts that have been undertaken to implement them.

D. 2000 Millennium Summit of the United Nations and 2010 High-level Plenary Meeting of the General Assembly on the Millennium Development Goals

28. Convened under the outlook of "The role of the United Nations in the twenty-first century" (see A/54/2000), the General Assembly held the Millennium Summit in 2000 and adopted a "United Nations Millennium Declaration" (resolution 55/2). While Member States did not specifically refer to oceans and seas in the Millennium Declaration, they considered as fundamental the need to show prudence in the management of all living and natural resources, in accordance with the precepts of sustainable development.[10] With reference to development and poverty eradication, they resolved to address the special needs of small island developing States by implementing, inter alia, the Barbados Programme of Action.[11] Member States also acknowledged the problems of landlocked countries and called for financial and technical assistance to them. They also emphasized the need for protecting our common environment and reaffirmed their support to the principles set out in Agenda 21.

[10] Resolution 55/2, para. 6.

[11] Programme of Action for the Sustainable Development of Small Island Developing States (*Report of the Global Conference on the Sustainable Development of Small Island Developing States, Bridgetown, Barbados, 25 April-6 May 1994* (United Nations publication, Sales No. E.94.I.18 and corrigenda)), chap. I, resolution 1, annex II.

29. On 22 September 2010, at its sixty-fifth session, the General Assembly adopted resolution 65/1 entitled "Keeping the promise: united to achieve the Millennium Development Goals", in which it emphasized, in particular, the need to take measures to ensure the sustainable management of marine biodiversity and ecosystems, including fish stocks, and to tackle the negative effects of climate change on the marine environment and marine biodiversity. The Millennium Development Goals Report (2010)[12] had noted that while the proportion of overexploited, depleted and recovering stocks had remained relatively stable since 2000, the negative impact of fisheries had increased with the declining percentage of moderately and underexploited fish stocks.

30. Member States recognized the special needs of and challenges faced by landlocked developing countries and called for the implementation of the 2003 Almaty Programme of Action, which addresses the "Special Needs of Landlocked Developing Countries within a New Global Framework for Transit Transport Cooperation for Landlocked and Transit Developing Countries".[13] Furthermore, concerns were also reiterated about the particular vulnerability of small island developing States to the high risks caused by climate change and sea-level rise. Member States reaffirmed their commitment to addressing those through the implementation of the 2005 Mauritius Strategy for the further Implementation of the Programme of Action for the Sustainable Development of small island developing States. They welcomed the five-year high-level review of the Mauritius Strategy, held on 24 and 25 September 2010, to assess progress made in addressing the vulnerabilities of small island developing States.

III. Achievements and implementation of outcomes of major summits on sustainable development

31. The present section provides information on some of the achievements since 1992 in the implementation of the outcomes of the major summits on sustainable development. It is divided into subsections on themes such as: legal and policy frameworks at the global and regional levels; marine biological diversity; sustainable fisheries; marine pollution; climate change and the oceans; and marine science and the transfer of technology. A subsection is also devoted to the special case of small island developing States. As it is not possible to comprehensively reflect the significant developments of the past since 1992 in the present report, reference is made to the annual reports of the Secretary-General on oceans and the law of the sea and sustainable fisheries, which contain further detailed information on those issues.

[12] Available from http: /mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2010/MDG_report_2010_En.pdf.

[13] Available from http://un.org/special-rep/ohrlls/lldc/Almaty_PoA.pdf.

A. Legal and policy frameworks at the global level

1. Legal framework

1982 United Nations Convention on the Law of the Sea

32. The recommendations of the United Nations Conference on the Human Environment, held at Stockholm in June 1972, considerably influenced the further development of the law of the sea in the context of the Third United Nations Conference on the Law of the Sea, convened in 1973. The provisions of the Convention adopted by that Conference in 1982 and the acceptance by many States of its regime shaped the discussions and the outcome of the subsequent major summits on sustainable development. Often referred to as "the Constitution of the oceans", the Convention, with 161 parties, continues to move towards the goal of universal participation, with all regions of the world widely represented. One hundred thirty-five coastal States, 25 landlocked States and one regional economic integration organization are parties to the Convention.

The Convention and the sustainable management of oceans

33. The problems of ocean space are closely interrelated and need to be considered as a whole through integrated, interdisciplinary and intersectoral approaches. In addition, cooperation and coordination at the national, regional and global levels is necessary to supplement the efforts of States in promoting the implementation of the Convention as well as the integrated management and sustainable development of the oceans and seas. Therefore, the mechanisms for the implementation of the Convention and the outcome of major summits have become intrinsically intertwined.

34. As recognized by Agenda 21,[14] the Convention sets out the legal framework within which all activities in the oceans and seas must be carried out and is of strategic importance as the basis for national, regional and global action and cooperation in the marine sector, and its integrity needs to be maintained.[15] While the Rio Conference was careful in specifying that mentions of the Convention in Agenda 21 did not prejudice the position of any State with respect to signature or ratification of or accession to the Convention, Chapter 17 of Agenda 21 made reference to the provisions of the Convention on several occasions, in particular concerning the protection and preservation of the marine environment, the conservation and sustainable use of marine living resources, both in the high seas and in areas under national jurisdiction, and on marine scientific research.

35. The Convention provides for a careful balance between the rights and obligations of States in the various maritime zones, including with respect to the various uses of the oceans and seas, the management and sustainable use of marine living resources, the protection and the preservation of the marine environment and the development and transfer of marine technology. It therefore sets forth the legal framework necessary for the sustainable development of the oceans and seas.

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[14] See *Report of United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I: Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

[15] Resolution 65/37, preamble.

36. The Programme for the Further Implementation of Agenda 21 noted the entry into force of the Convention and the adoption of the Agreement on the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks as achievements of the United Nations Conference on Environment and Development.[16] It also recognized that the Convention provides the overall legal framework for global decision-making on the marine environment.[17] The Johannesburg Plan of Implementation went further by inviting States to ratify or accede to and implement both the Convention and the Agreement, while recognizing the former's role as the overall legal framework for all ocean activities.[18]

Institutions

37. The Convention established three institutions: the International Tribunal for the Law of the Sea, the International Seabed Authority and the Commission on the Limits of the Continental Shelf. Even though sustainable development does not represent the focus of any of these institutions, the discharge of their functions indirectly contributes to the achievement of sustainable development. In particular, the International Seabed Authority, which deals with the international seabed area beyond national jurisdiction (the "Area") and its resources, also undertakes activities to ensure the environmentally sustainable development of the Area and its resources (see paras. 112-114).

38. Since the entry into force of the Convention, States Parties have discussed issues of implementation and application of the Convention.

39. Other global instruments that make up the international legal and policy framework developed since 1992 and relate to specific areas are described in sections III, B to C, below.

2. Policy framework

Commission on Sustainable Development

40. The Commission on Sustainable Development was established as a functional commission of the Economic and Social Council by its decision 1993/207 of 12 February 1993. The role of the Commission as a high-level forum on sustainable development includes to review progress at the international, regional and national levels in the implementation of the recommendations and commitments of the United Nations Conference on Environment and Development; to elaborate policy guidance and options for future activities; and to follow up the Johannesburg Plan of Implementation and achieve sustainable development, including the preservation of the seas, oceans, islands and coastal areas.

41. The Commission on Sustainable Development focused on ocean issues most notably at its fourth and seventh session held in 1996 and in 1998 and 1999, respectively, prior to the establishment of the Informal Consultative Process in 1999. The Commission on Sustainable Development is expected to review the implementation of Chapter 17 at its twenty-second session in 2014.

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[16] General Assembly resolution S-19/2, annex, para. 13.

[17] Ibid., para. 36.

[18] Johannesburg Plan of Implementation (see note 9, above), para. 30.a.

42. At its fourth session, held in 1996, the Commission on Sustainable Development reviewed progress in the implementation of the objectives set out in Chapter 17 of Agenda 21 on oceans and seas. Following the meeting of the Commission on Sustainable Development, the Economic and Social Council recommended that the need be stressed for international cooperation, including capacity-building and technology transfer and cooperation, and for the mobilization of financial resources. It also called upon bilateral donors and international, regional and subregional financial institutions and mechanisms, including the GEF, and other competent development and financial institutions to ensure that their programmes gave appropriate priority for country-driven projects aimed at the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (the Global Programme of Action).

43. UNEP was invited to take action to provide for the establishment and implementation of the clearing-house mechanism referred to in the Global Programme of Action. States were also encouraged to take part in its establishment. Non-governmental organizations and major groups were invited to initiate and strengthen their actions to facilitate and support the effective implementation of the Global Programme of Action.

44. At the seventh session of the Commission, held in 1998 and 1999, participants focused on concluding a decision on oceans and seas and paid special attention to the observations, recommendations and proposals produced at the Intersessional Ad Hoc Working Group on Oceans and Seas and on the Sustainable Development of Small Island Developing States (see E.CN/17/1999/20).

45. While noting the progress achieved in the area of oceans and seas, States urged early ratification of the relevant remaining agreements for their early entry into force. Implementation and the building of capacity as well as mobilization of the necessary resources were deemed critical.

46. Coordination between the different parts of national administrations was also necessary to ensure that national action was integrated and that international bodies did not receive conflicting directions from their Member States.

47. With regard to fisheries and other living marine resources, the Commission highlighted the crucial importance of ensuring continuing sustainable supply of food and the need to protect marine biological diversity. It was important for the Commission to make clear that these two concerns underpinned the need for effective and integrated fisheries management and the protection of the habitats of fish and other biota. States launched a call for action to eliminate overfishing and wasteful fishing practices by undertaking national assessments of fish stocks and supporting the work of regional fisheries organizations in improving required scientific data (see para. 24). The need to take early steps to eliminate overcapacity in many fisheries was stressed. Attention was also drawn to the importance of coral reefs, both as indicators of the health of the oceans and seas and as a basis for tourist activities.

48. In its decision 7/1, the Commission emphasized that oceans and seas constituted the major part of the planet that supported life, drive the climate and hydrological cycle, and provide the vital resources for mankind and many other living species. It identified major challenges at the national, regional and global levels to foster the sustainable management of oceans. The Commission

recommended that particular priority be given to the conservation, integrated and sustainable management and sustainable use of marine living resources, the prevention of pollution and degradation of the marine environment from land-based and other activities, better scientific understanding of the oceans and seas and their interaction with the world climate system, and encouraged, at the national, regional and global levels, the steps necessary for an effective and coordinated implementation of the provisions of the Convention and Agenda 21 (see also A/64/66, para. 6).

49. The Commission also identified key sectors where further commitments were needed. It urged the international community to support coastal and island developing States in the development of sustainable fisheries and aquaculture. It encouraged all States to become Parties to, or, as the case may be, to apply the FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas of 24 November 1993, the Agreement of 4 August 1995 (see sect. III.C.2, below) and the FAO Code of Conduct for Responsible Fisheries of 31 October 1995. The Commission emphasized both the vital role of those instruments in safeguarding fish stocks and the need to implement them effectively.

50. The Commission endorsed the International Coral Reef Initiative call to action and urged implementation of complementary actions by States, intergovernmental organizations and other bodies, non-governmental organizations and the private sector. It also urged support for national efforts to gain greater access to resource information and to develop appropriate policies to facilitate the exploration and exploitation of marine living resources and non-living marine resources.

51. In 2012, the United Nations Conference on Sustainable Development will be held in Brazil to mark the twentieth anniversary of the Earth Summit and the tenth anniversary of the World Summit. The objective of the Conference is to secure renewed political commitment for sustainable development, assess the progress to date and the remaining gaps in the implementation of the outcomes of the major summits on sustainable development, and address new and emerging challenges.[19]

52. The key themes of the Conference will be "Green Economy in the context of Poverty Eradication and Sustainable Development" and "Institutional Framework for Sustainable Development". The Conference will also provide an opportunity to review progress made in the implementation of the objectives set out in Chapter 17 of Agenda 21 and other key commitments made at major summits and conferences related to seas and oceans.

The General Assembly and the oceans and seas

53. With the entry into force of the Convention, the General Assembly assumed the role of overseeing developments relating to the Convention, the law of the sea and ocean affairs in general. It carries out an annual review of such developments under a consolidated agenda item entitled "Oceans and the law of the sea". The resolutions adopted by the General Assembly under that agenda item consistently emphasize the sustainable development of the oceans and seas.

[19] Information available from http://earthsummit2012.org/.

The United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea

54. Decision 7/1 of the Commission on Sustainable Development on oceans and seas (see para. 48 above) recommended, inter alia, that the General Assembly consider ways and means of enhancing the effectiveness of its annual debate on oceans and the law of the sea. Because of the complex and interrelated nature of the oceans, it noted that oceans and seas present a special case as regards the need for international coordination and cooperation. In order to promote improved cooperation and coordination, the Commission recommended that the General Assembly establish an open-ended Informal Consultative Process, with the sole function of facilitating the effective and constructive consideration of matters within the Assembly's existing mandate on the basis of decision 7/1.[20]

55. Since its inception,[21] the Informal Consultative Process has emphasized the importance of the oceans and seas for providing vital resources for food security and for sustaining economic prosperity and the well-being of present and future generations. The summaries of discussions and other outcomes of the Informal Consultative Process, including agreed consensual elements, have strengthened General Assembly resolutions on oceans, the law of the sea and sustainable fisheries and contributed to improving coordination and cooperation between States.

56. By its resolution 65/37, the General Assembly recognized "the role of the [Informal] Consultative Process as a unique forum for comprehensive discussions on issues related to oceans and the law of the sea, consistent with the framework provided by the Convention and Chapter 17 of Agenda 21, and that the perspective of the three pillars of sustainable development should be further enhanced in the examination of the selected topics". It also recognized "the primary role of the [Informal] Consultative Process in integrating knowledge, the exchange of opinions among multiple stakeholders and coordination among competent agencies, and enhancing awareness of topics, including emerging issues, while promoting the three pillars of sustainable development".

Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction

57. The marine environment beyond areas of national jurisdiction including the seabed still remains largely unexplored. However, current limited knowledge shows that it is host to unique and diverse species and ecosystems that contribute vital services that benefit mankind. At the World Summit, in recognition of that key role in sustaining life on Earth, States committed themselves to maintaining the productivity and biodiversity of important and vulnerable marine and coastal areas, including in areas beyond national jurisdiction.[22] There was growing evidence of the degradation of marine ecosystems and their biodiversity, including beyond areas of national jurisdiction (A/60/63/Add.1, para. 9).

58. By its resolution 59/24, dated 17 November 2004, the General Assembly established the Ad Hoc Open-ended Informal Working Group to study issues

[20] A/64/131, para.16.

[21] Pursuant to resolution 54/33 of 24 November 1999.

[22] Johannesburg Plan of Implementation, para. 32 (a).

relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction (the Working Group). The Working Group was mandated to: (a) survey the past and present activities of the United Nations and other relevant international organizations with regard to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction; (b) examine the scientific, technical, economic, legal, environmental, socio-economic and other aspects of those issues; (c) identify key issues and questions where more detailed background studies would facilitate consideration by States of those issues; (d) indicate, where appropriate, possible options and approaches to promote international cooperation and coordination for the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction. The mandate of the Working Group offers an opportunity to consider all the issues relating to marine biological diversity beyond areas of national jurisdiction in an integrated, cross-cutting and cross-sectoral manner.

59. The Working Group has met in 2006, 2008 and 2010 and a meeting is scheduled to be held from 31 May to 3 June 2011. At the meetings, the central role of the General Assembly as the global institution with competence to deal comprehensively with complex and multidisciplinary issues, such as those relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction, was reiterated (A/61/65, para. 7). In the context of its mandate, it has focused on issues such as the environmental impacts of anthropogenic activities; cooperation and coordination among States and relevant organizations and bodies; area-based management tools, including marine protected areas; genetic resources; whether there is a governance or regulatory gap and if so how it should be addressed; environmental impact assessments; strengthening the information base; capacity-building and technology transfer; and cooperation and coordination in implementation and for integrated ocean management and ecosystem approaches (for further information, see A/61/65, A/63/79, A/65/68 and A/66/70).

The Regular Process for global reporting and assessment of the state of the marine environment, including socio-economic aspects

60. In paragraph 36 (b) of the Johannesburg Plan of Implementation, States agreed to "establish by 2004 a regular process under the United Nations for global reporting and assessment of the state of the marine environment, including socio-economic aspects, both current and foreseeable, building on existing regional assessments" (the Regular Process). The General Assembly endorsed that call in paragraph 45 of its resolution 57/141 of 16 December 2002, and has continuously reiterated the need to strengthen the regular scientific assessment of the state of the marine environment in order to enhance the scientific basis for policymaking.

61. By resolution 60/30 of 29 November 2005, the General Assembly launched the start-up phase to the Regular Process, called the "assessment of assessments", which concluded in 2009 with a report on the results of the assessment of assessments (see A/64/88, annex).

62. The General Assembly, by paragraph 157 of resolution 63/111 of 5 December 2008, established an Ad Hoc Working Group of the Whole to recommend a course

of action for the Regular Process. The Working Group of the Whole met twice.[23] The Assembly endorsed the recommendations adopted by the Working Group of the Whole that proposed a framework for the Regular Process, described its first cycle and a way forward. The framework consists of the overall objective and scope; a set of principles guiding the establishment and operation of the Regular Process; and best practices on key design features. Capacity-building, the sharing of data, information and the transfer of technology are also crucial elements of the Regular Process. In the first cycle, the Regular Process will focus on establishing a baseline for the state of the marine environment. In subsequent cycles, the scope would extend to evaluating trends (see A/64/347).

63. At its meetings, the Working Group of the Whole agreed that the Regular Process should aim at strengthening the science-policy interface for the sustainable use, management and conservation of the oceans and seas and their resources and biodiversity, as well as long-term human well-being and sustainable development. The Working Group of the Whole recalled the important role that oceans played in meeting internationally agreed commitments related to sustainable development and the Millennium Development Goals and how the Regular Process could contribute to achieving those commitments.

64. At its sixty-fifth session, the General Assembly decided that the Regular Process would be an intergovernmental process. It also decided on institutional arrangements for the Regular Process, including an Ad Hoc Working Group of the Whole of the General Assembly to oversee and guide the Regular Process and a Group of Experts (see resolution 65/37, paras. 197 to 217). The first meeting of the Ad Hoc Working Group of the Whole was held in February 2011 (A/65/759).

65. UNESCO noted that there were possible modalities of coordination between the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (see para. 226 below) and the Regular Process.[24] IOC reported that it was currently leading the two marine components of the GEF Transboundary Waters Assessment Programme, for the Large Marine Ecosystems and the open ocean (see A/66/70, sect. II.J.1), which were expected to contribute to the Regular Process. Observing that strong institutional support would be needed across the United Nations system to support the Regular Process, IOC noted the opportunity in that regard of the 2012 United Nations Conference on Sustainable Development, which is expected to review all international commitments, including the Regular Process.[25] The Department of Economic and Social Affairs of the Secretariat[26] noted that the Regular Process could serve to highlight, inter alia, the consequences of ocean acidification on sustainable development.

United Nations Environment Programme

66. UNEP provides leadership and encourages partnership in caring for the environment, including the marine environment, by inspiring, informing and enabling nations and peoples to improve their quality of life without compromising that of future generations. It facilitates and promotes the wise use of the planet's natural assets for sustainable development, by inter alia, integrating economic

[23] See A/64/347 and A/65/358.

[24] UNESCO contribution.

[25] IOC contribution.

[26] Contribution of the Department of Economic and Social Affairs of the Secretariat.

development and environmental protection and facilitating the transfer of knowledge and technology for sustainable development. It hosts a number of environmental convention secretariats, including the Convention on Biological Diversity. It was established in 1972 after the United Nations Conference on the Human Environment. In 2002, the World Summit reaffirmed the central role of UNEP in international efforts to achieve sustainable development. UNEP works to develop policy guidelines to address major environmental issues, such as the degradation of the marine environment. It has also initiated a ministerial-level intergovernmental process to strengthen environmental governance and reinvigorate global commitment to sustainable development.[27]

67. Under the Medium-Term Strategy of UNEP for 2010-2013,[28] the Marine and Coastal Strategy has been developed to focus on priority issues for maintaining marine ecosystems and their services for human well-being. The Strategy is implemented by UNEP's Marine and Coastal Ecosystem Branch, which is responsible for coordinating the Regional Seas Programme, the Global Programme of Action, Marine Ecosystems Management and Small Island Developing States. Almost all Branch activities strive to implement relevant outcomes of summits on sustainable development. The Branch intends to increase its collaboration with other United Nations agencies, research institutions and non-governmental organizations to meet its objectives.[29] UNEP also promotes the use of sound science to apply ecosystem management to address factors causing the decline of ecosystem services in marine and coastal areas.

B. International cooperation and coordination

1. At the international level

UN-Oceans

68. Paragraph 17.118 of Agenda 21 called for enhanced coordination among United Nations organizations with major marine and coastal responsibilities and institutions and specialized agencies dealing with development, trade and other related economic issues. That led to the establishment of the Sub-committee on Oceans and Coastal Areas of the Administrative Committee on Coordination, whose task was, inter alia, to monitor and review the implementation of Chapter 17. Taking into account the decisions of the World Summit[30] and the third meeting of the Informal Consultative Process (A/57/80), the General Assembly established in its resolution 58/240 the Oceans and Coastal Areas network (known as UN-Oceans), as an "effective, transparent, and regular inter-agency coordinating mechanism on oceans and coastal issues within the United Nations".[31]

69. UN-Oceans operates as a mechanism to review joint and overlapping ongoing activities and to support related deliberations at the Informal Consultative Process, in particular by (a) enhancing cooperation and coordination among the secretariats of the international organizations and bodies concerned with ocean-related

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[27] See http://unep.org/PDF/ABOUT_UNEP_ENGLISH.pdf.

[28] Available from www.unep.org/PDF/FinalMTSGCSS-X-8.pdf.

[29] UNEP contribution.

[30] Johannesburg Plan of Implementation (note 9, above), para. 30 (c).

[31] A/59/62, para. 296.

activities; (b) reviewing programmes and activities and identifying issues needing to be addressed, with a view to updating and enriching the relationship between the Convention and Agenda 21; (c) ensuring integrated ocean management at the international level; and (d) undertaking joint activities to address emerging challenges and issues.[32]

70. To foster coordination and joint activities and pursue time-bound initiatives, UN-Oceans has established task forces on key issues. The task force on the Regular Process was created in support, inter alia, of the Assessment of Assessments. The task force on marine protected areas aims in particular at addressing the goals and targets of the Convention on Biological Diversity and the World Summit (see sect. III, C and D). The task force on biodiversity in marine areas beyond national jurisdiction was established to facilitate, as appropriate, the implementation of relevant recommendations of the General Assembly addressed to competent international organizations to achieve a coordinated approach and follow-up action by relevant organizations.[33] In addition to its task forces, UN-Oceans provides oversight and direction to the United Nations Atlas of the Oceans (www.oceansatlas.org), a web-based information system bringing together data on ocean and marine sustainable development and management issues, maps and development trends produced by the United Nations system and selected partners.

71. While UN-Oceans is of the view it can play an important role in the management of the oceans, there is a general consensus on the need for strategic planning to strengthen the structure of UN-Oceans and raise its profile and visibility. Such can be achieved by, for example, strengthening cooperation between similar mechanisms, such as UN-Water.[34] Moreover, UN-Oceans noted that the United Nations system could not fulfil all the goals entrusted to it without adequate funding and support from Member States.[35]

2. At the regional level

72. Implementation of the outcomes of the major conferences on sustainable development has also been undertaken at the regional level through various regional organizations and cooperation mechanisms. There follow some examples in that regard, as well as specific examples of implementation at the regional level in sections relating to specific thematic areas.

UNEP regional seas programmes

73. The UNEP Regional Seas Programme was launched in 1974. The Programme aims to address the accelerating degradation of the world's oceans and coastal areas through the sustainable management and use of the marine and coastal environment, by engaging neighbouring countries in comprehensive and specific actions to protect their shared marine environment.[36]

74. More than 140 countries participate in 13 regional seas programmes established under the auspices of UNEP: Black Sea, Wider Caribbean, East Asian

[32] A/60/63, para. 316.
[33] A/65/69/Add.2, para. 407.
[34] A/65/69/Add.2, para. 410.
[35] A/63/174, para. 132.
[36] Available from www.unep.org/regionalseas/about/default.asp.

Seas, Eastern Africa, South Asian Seas, Sea area of the Regional Organization for the Protection of the Marine Environment, Mediterranean, North-East Pacific, North-West Pacific, Red Sea and Gulf of Aden, South-East Pacific, Pacific and Western Africa.

75. Most of the programmes function through action plans that are adopted by Member States in order to establish a comprehensive strategy and framework for protecting the environment and promoting sustainable development. An action plan outlines the strategy and substance of the programme, based on the region's particular environmental challenges as well as its socio-economic and political situation.

76. A number of legally binding conventions have been adopted by the programmes to tackle common environmental issues through joint coordinated activities. Most conventions have added protocols addressing specific issues such as protected areas or land-based pollution. The General Assembly has encouraged States that have not done so to become parties to the regional seas conventions.[37]

77. Global meetings of the regional seas conventions and action plans take place annually. The twelfth meeting took place in Bergen, Norway from 20 to 22 September 2010. Many activities undertaken by the various regional seas programmes to promote sustainable development have been featured in recent reports of the Secretary-General on oceans and the law of the sea.[38]

Partner regional seas programmes

78. In addition to the UNEP regional seas programmes, there are five partner programmes for the Antarctic, Arctic, Baltic Sea, Caspian Sea and North-East Atlantic regions. Although these programmes have not been established under the auspices of UNEP, they participate in the global meetings of the regional seas, share experiences and exchange policy advice and support to the developing regional seas programmes. The role of the global regional seas programme is to enhance linkages, coordination and synergies within and among global, regional and partner programmes, organizations and actors. In return, the partner programmes support the implementation of the global regional seas strategic directions and report regularly on their progress. These programmes similarly undertake diverse activities to promote sustainable development of the oceans.

79. The Antarctic, Baltic Sea, Caspian Sea and North-East Atlantic programmes are based on binding instruments that protect the marine environment.[39] In the Arctic, the Arctic Council is a high-level intergovernmental forum promoting cooperation, coordination and interaction among the Arctic States, with the involvement of Arctic indigenous communities and other Arctic inhabitants on common Arctic issues, in particular sustainable development and environmental protection in the Arctic.[40]

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[37] Resolution 65/37, para. 133.

[38] A/65/69/Add.2, sect. XI, L.

[39] These include the 1969 Antarctic Treaty and its 1991 Protocol on Environmental Protection, the 1980 Convention on the Conservation of Antarctic Marine Living Resources, the 1992 Convention on the Protection of the Marine Environment of the Baltic Sea, and the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic.

[40] See http://arctic-council.org/article/about.

European Integrated Maritime Policy

80. On 10 October 2007, the European Commission presented its vision for an "Integrated Maritime Policy for the European Union" (COM (2007) 575)[41] with a view to gradually reaching an integrated, coherent and common decision-making procedure for oceans, seas, States, coastal regions and maritime sectors within the European Union. The Integrated Maritime Policy, by promoting multi-sector and multi-level maritime governance, directly involves coastal regions in environmental, maritime transport, energy, research, industry, fisheries and innovation policies, which are all crucial underpinnings of sustainable development.

81. Over recent years, the Integrated Maritime Policy has been further enriched by specific contributions such as its environmental pillar, the 2008 Marine Strategy Framework Directive,[42] and the 2009 Communication from the European Commission, entitled "Towards an Integrated Maritime Policy for better governance in the Mediterranean".[43]

82. The Integrated Maritime Policy for better governance in the Mediterranean aims to improve the ability of coastal States to respond together to the maritime challenges facing the Mediterranean sea basin. That includes the strengthening of integrated coastal zone management in coastal areas and islands, the development of marine knowledge and integration between marine and maritime research efforts, as the basis of an ecosystem-based approach to the management of activities at sea. In addition, the surveillance of maritime activities and operations in the Mediterranean will be continued.

African Union

83. In October 2009, the African Union adopted the African Maritime Transport Charter and Plan of Action to build trade capacity and envision a united approach to industry threats such as piracy.[44] That charter recognizes the interdependence between economic development and a sustainable policy for the protection and preservation of the marine environment, as well as the need for Africa to fully and effectively implement the 2003 Almaty Declaration and Programme of Action on addressing the special needs of landlocked developing countries. It also recognizes the importance of the role of maritime transport in the promotion of economic development and the achievement of the Millennium Development Goals. The Durban Resolution and Plan of Action on Maritime Transport were also adopted in the same year.[45]

84. NEPAD has developed an action plan[46] under its Environment Initiative aimed at addressing the region's environmental challenges to ensure sustainable development and poverty alleviation. Reference is made to coastal management as one of the eight sub-themes of the Initiative.[47] The action plan was developed in

[41] Available from http://ec.europa.eu/maritimeaffairs/policy_documents_en.html.
[42] Available from http://ec.europa.eu/environment/water/marine/index_en.htm.
[43] Available from http://ec.europa.eu/maritimeaffairs/pdf/com_2009_466_en.pdf.
[44] Available from http://africa-union.org/root/AU/Documents/Treaties/Text/AFRICAN_MARITIME_TRANSPORT.pdf.
[45] Available from http://au.int/en/treaties.
[46] Available from www.nepad.org/system/files/Environment%20Action%20Plan.pdf.
[47] Available from http://nepad.org/climatechangeandsustainabledevelopment/climatechange/about.

close cooperation with the African Union and with the support of UNEP and the Global Environment Facility.

85. The action plan includes clusters of programmatic and project activities on: marine and coastal resources; cross-border conservation of natural resources; climate change; and cross-cutting issues building upon the related problems of, inter alia, pollution, capacity-building and technology transfer.

86. The Environment Initiative recognizes that marine and coastal ecosystems contribute significantly to the economies of NEPAD countries, based on estimates indicating that over 40 per cent of Africa's population derives its livelihood from coastal and marine ecosystems and resources that are under increasing stress from a wide array of anthropogenic impacts. The situation is more aggravated in some of Africa's small island States.

Pacific Islands Regional Ocean Policy

87. Ocean and coastal resources and environments are of vital importance to the nations, communities and individuals of the Pacific Islands. The Pacific Islands Regional Ocean Policy[48] is supported by 22 Pacific island countries and territories and underscores the continuing importance of these resources and environments to sustainable development.

88. The Pacific Islands Regional Ocean Framework for Integrated Strategic Action serves as a guide for regional coordination, integration and collaboration on ocean issues in keeping with the Policy's goal of improving ocean governance and ensuring sustainable use of the ocean and its resources.

89. The Marine Sector Working Group of the Council of Regional Organisations in the Pacific was tasked with developing a regional ocean policy, which was subsequently endorsed in 2002 by the thirty-third Pacific Islands Forum. Forum leaders also called for follow-up action plans, both for the region and for individual countries.

C. Implementation in thematic areas

1. Conservation and sustainable use of marine biodiversity

90. The Earth's biological resources are vital to life and people's economic and social development. As recognized by paragraph 15.3 of Agenda 21, biological resources constitute a capital asset with great potential for yielding sustainable benefits. Among many ecosystem services, they produce a third of the oxygen that we breathe, offer a valuable source of protein and have a role in the global climate cycle. Despite the value of the services provided, the loss of the world's biological diversity, in particular marine biodiversity, has continued, mainly as a result of habitat destruction, overharvesting, pollution and invasive alien species.

91. Chapter 15 of Agenda 21 identified a number of activities related to management, data and information, as well as international and regional cooperation and coordination in order to achieve the conservation of biodiversity and the sustainable use of biological resources.

[48] Available from http://forum.forumsec.org/resources/uploads/attachments/documents/PIROP.pdf.

92. Chapter 17 specifically relates to marine biodiversity and should be read in conjunction with Chapter 15. It requires coastal States, with the support of international organizations, to undertake measures to maintain the biodiversity and productivity of marine species and habitats under their national jurisdiction. States are required to identify marine ecosystems exhibiting high levels of biodiversity and productivity and other critical habitat areas, and should provide necessary limitations on uses in these areas, through, inter alia, the designation of protected areas. Priority should be accorded to coral reef ecosystems; estuaries; temperate and tropical wetlands, including mangroves; seagrass beds; and other spawning and nursery areas. States, individually or through bilateral and multilateral cooperation, are also required to complete or update marine biodiversity, marine living resource and critical habitat profiles of exclusive economic zones and other areas under national jurisdiction, taking account of changes in the environment brought about by natural causes and human activities. Marine biodiversity is also referred to in relation to small island developing States.

93. At the World Summit, States committed, inter alia, to maintaining the productivity and biodiversity of important and vulnerable marine and coastal areas, including in areas within and beyond national jurisdiction, and to implementing the work programme arising from the Jakarta Mandate on Marine and Coastal Biological Diversity.[49] They also called for the development of diverse tools, including the ecosystem approach and the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks, by 2012. States urged the development of national, regional and international programmes for halting the loss of marine biodiversity and implementing the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention), including its joint work programme with the Convention on Biological Diversity and the programme of action called for by the International Coral Reef Initiative to strengthen joint management plans and international networking for wetland ecosystems in coastal zones.[50]

94. At the World Summit, States also committed to achieving by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth. In order to do so, States noted the need for the provision of new and additional financial and technical resources to developing countries. They further committed to a number of actions at all levels for the conservation and sustainable use of biodiversity.[51]

95. While the 2010 target was not met,[52] a number of activities have been undertaken in the context of the Convention on Biological Diversity, the General Assembly and other forums towards the conservation and sustainable use of marine biological diversity.

Developments within the Convention on Biological Diversity

96. In response to the global decline in biodiversity, and following four years of negotiations, the Convention on Biological Diversity opened for signature on 5 June

[49] Available from www.cbd.int/doc/publications/jm-brochure-en.pdf.

[50] Johannesburg Plan of Implementation (note 9 above), para. 32.

[51] Ibid., para. 44.

[52] www.cbd.int/doc/publications/gbo/gbo3-final-en.pdf.

1992 at the United Nations Conference on Environment and Development and entered into force on 29 December 1993. The Convention, which has for objectives the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits from the use of genetic resources, has 193 parties.[53] It applies in areas within the limits of national jurisdiction in the case of components of biological diversity and within national jurisdiction or beyond in the case of processes and activities, regardless of where their effects occur, carried out under a State's jurisdiction or control (article 4). With respect to the marine environment, the Parties to the Convention on Biological Diversity are required to implement it consistently with the rights and obligations of States under the law of the sea (article 22).

97. The decisions of the Conference of the Parties, based on advice from its Subsidiary Body for Scientific, Technical and Technological Advice (the Subsidiary Body) have sought to operationalize the three objectives of the Convention on Biological Diversity (see para. 96). Marine and coastal biodiversity was an early priority for the Conference of the Parties of the Convention on Biological Diversity. In particular, the Conference of the Parties adopted decision IV/5[54] on the conservation and sustainable use of marine and coastal biological diversity which included a programme of work arising from decision II/10. The programme contained elements on integrated marine and coastal area management; marine and coastal living resources; marine and coastal protected areas; mariculture; alien species; and genotypes.

98. The Conference of the Parties has continuously reviewed the implementation of the programme of work and provided guidance to Parties, the Convention on Biological Diversity Secretariat and the Subsidiary Body on further actions needed in respect of each of the elements of the programme of work.[55] The programme of work was expanded at the fifth meeting of the Conference of the Parties, held in Nairobi in 2000, to include a work element on coral reefs, accompanied by a workplan on coral bleaching. In 2004, the Conference of the Parties adopted an elaborated programme of work, which included activities designed to help the Parties to overcome obstacles to implementation and relevant activities from the Johannesburg Plan of Implementation. At its tenth meeting, held in Nagoya, Japan in 2010, the Conference of the Parties noted with concern that progress in the implementation of the programme had not been able to prevent the serious decline in marine and coastal biodiversity and ecosystem services (decision X/29).

99. Coral reefs, including coral bleaching, have been a particular area of attention for the Parties.[56] Over the years, the Conference of the Parties has also considered new and emerging issues affecting marine biodiversity, including marine biodiversity beyond areas of national jurisdiction. In 2006, the Conference of the Parties discussed the conservation and sustainable use of deep seabed genetic resources beyond the limits of national jurisdiction (decision VIII/21). Also at that meeting, in decision VIII/24 on protected areas, the Conference of the Parties expressed its deep concern over the range of threats to marine ecosystems and biodiversity beyond national jurisdiction, and recognized that marine protected areas

[53] Available from www.cbd.int/convention/parties/list/.

[54] Available from www.cbd.int/decision/cop/?id=7128.

[55] See https://cbd.int/marine/pow.shtml.

[56] For a summary of the relevant activities undertaken, see http://cbd.int/marine/coral.shtml.

were an essential tool to help achieve conservation and sustainable use of biodiversity in these areas. It also recognized that the Convention on Biological Diversity had a key role in supporting the work of the General Assembly with regard to those areas beyond national jurisdiction (see paras. 57-59), by focusing on provision of scientific and, as appropriate, technical information and advice.

100. In 2008, in decision IX/20, the Conference of the Parties adopted scientific criteria for identifying ecologically or biologically significant marine areas in need of protection and scientific guidance for designing representative networks of marine protected areas, and took note of the four initial steps to be considered in the development of representative networks of marine protected areas.

101. Also at that meeting, the Executive Secretary of the Convention on Biological Diversity was requested to compile and synthesize scientific information on the potential impacts on marine biodiversity of both direct human-induced ocean fertilization to sequester carbon dioxide and ocean acidification. In its decision on biodiversity and climate change (decision IX/16), the Conference of the Parties also recognized the current absence of reliable data covering all relevant aspects of ocean fertilization and requested the Parties to ensure that ocean fertilization activities do not take place until there was an adequate scientific basis on which to justify such activities (see also para. 202).

102. In 2010, in decision X/29, the Conference of the Parties reaffirmed that the programme of work still corresponded to global priorities and had been further strengthened while not fully implemented. It therefore provided guidance for enhanced implementation, including with respect to marine biodiversity. It also specifically elaborated further guidance on the identification of ecologically and biologically significant areas and scientific and technical aspects relevant to environmental impact assessment in marine areas; and the impacts of unsustainable fishing, ocean fertilization, ocean acidification, and other human activities. By decision X/13, the Conference of the Parties also requested the Subsidiary Body to consider the impacts of ocean acidification on marine biodiversity and habitats and to take into account, in the implementation of the programmes of work on protected areas and on marine and coastal biodiversity, the impact of ocean noise on marine protected areas (see also sect. IV.C.6 below).

103. The new Strategic Plan, adopted by the Conference of the Parties at its tenth meeting and aimed at achieving a significant reduction of biodiversity loss by 2020, includes a number of targets relevant to marine biodiversity. In particular, by decision X/2, it was agreed that, by 2020, at least 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services would be conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider seascapes. The Strategic Plan also aims to minimize the anthropogenic pressures on coral reefs and other vulnerable ecosystems impacted by climate change or ocean acidification by 2015, so as to maintain their integrity and functioning (see also sect. IV.C.2).

104. The annual reports of the Secretary-General on oceans and the law of the sea have provided greater details on the measures and activities undertaken in the

context of the Convention on Biological Diversity in relation to the above-mentioned decisions.[57]

Developments in other forums

105. Marine biodiversity is addressed in a number of other conventions and forums, in the context of which decisions have been adopted and activities undertaken for the conservation and sustainable use of marine species and habitats. The annual reports of the Secretary-General on oceans and the law of the sea provide information on the activities undertaken in the context of these conventions and forums. Additional information is also found throughout the present report.

Biodiversity-related conventions and initiatives

106. The Convention on International Trade in Endangered Species of Wild Flora and Fauna was adopted in 1973. It entered into force in 1975 and has 175 Parties. It aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival, by banning commercial international trade in an agreed list of endangered species and by regulating and monitoring trade in others that might become endangered. The import, export, re-export and introduction from the sea of species covered by that Convention has to be authorized through a licensing system. Marine species are listed under that Convention, including some species of sea turtles, great whales, the basking and whale sharks, the entire genus of seahorses and dolphins.

107. The secretariat of the Convention on International Trade in Endangered Species indicated that it was in the process of preparing its contribution to the United Nations Conference on Sustainable Development. With regard to progress to date, remaining gaps and new or emerging challenges, it highlighted that in the context of the 2010 biodiversity target, although the target of having no species of wild flora and fauna endangered by international trade was not achieved globally, some progress had been made and successes achieved through the implementation of that Convention. It drew attention to a number of its activities to address emerging issues, gaps and challenges, including (a) participation in a number of initiatives such as the Biodiversity Indicators Partnership, the Green Economy Report,[58] The Economics of Ecosystems and Biodiversity,[59] and meetings on an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (see para. 226); (b) enhanced cooperation with biodiversity-related conventions, the Rio Conventions, the International Convention for the Regulation of Whaling, the natural resource sector, including FAO and the International Commission for the Conservation of Atlantic Tunas, the trade sector, including UNCTAD and WTO, the financial sector, including GEF and the World Bank, and the law enforcement sector, including the United Nations Office for Drugs and Crime, Interpol and the World Customs Organization; (c) enhancement of the complementarity between that Convention and intergovernmental bodies and agreements addressing marine

[57] See A/65/69, para. 172; A/65/69/Add.2, paras. 199-202 and A/66/70, paras. 68, 76, 99, 104, 110, 157, 162, 163, 170 and 171.

[58] Available from http://unep.org/greeneconomy/GreenEconomyReport/tabid/1375/Default.aspx.

[59] Available from http://teebweb.org/.

species; and (d) continuing work on a common understanding and uniform implementation of the provisions of the Convention on introduction from the sea.[60]

108. In response to recommendation 32 of the Action Plan adopted by the 1972 United Nations Conference on Human Environment,[61] the Convention on Migratory Species of Wild Animals was adopted in 1979 and entered into force in 1983. Today, it has 115 parties. That Convention, in its preamble, recognizes that wild animals are an irreplaceable part of the Earth's natural system, which must be conserved for the good of mankind and the value of wild animals from environmental, ecological, genetic, scientific, aesthetic, recreational, cultural, educational, social and economic points of view. That Convention includes provisions for the protection of migratory species and their habitats. The conclusion of multilateral agreements and memorandums of understanding is required for the conservation and management of migratory species. Several of the agreements concluded to date specifically cover marine species.[62] Information management systems have been established to provide information on the species, geographic information system maps and population data, among others.[63] A number of other conservation activities have been undertaken that have contributed to sustainable development and sought to achieve the targets of the World Summit.[64]

109. Wetlands are among the world's most productive environments, providing numerous ecosystem services such as freshwater supply, food and building materials, biodiversity, flood control, groundwater recharge and climate change mitigation.[65] The Ramsar Convention was adopted in 1971 and entered into force in 1975. It has 160 contracting parties. The Convention's objective is the conservation and wise use of all wetlands through local, national and regional actions and international cooperation, as a contribution towards achieving sustainable development throughout the world. Under the Ramsar Convention, Parties must, among other actions, designate wetlands for inclusion in the Ramsar List and promote their conservation, as well as the wise use of wetlands in their territory. The definition of wetlands in the Ramsar Convention includes most coastal zones around the world. To date, a large number of the 1929 sites included on the Ramsar List, are coastal and marine wetlands.[66] A number of activities, including awareness-raising and assistance programmes, have contributed to the implementation of the Ramsar Convention and sought to contribute to the achievement of the targets of the World Summit.

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[60] Secretariat of the Convention on International Trade in Endangered Species contribution.

[61] Recommendation 32 recommended that Governments give attention to the need to enact international conventions and treaties to protect species inhabiting international waters or those that migrate from one country to another.

[62] The text of the agreements and memorandums of understanding is available at http://cms.int/species/index.htm.

[63] More information available from www.unep-wcmc-apps.org/isdb/Taxonomy/and from http://groms.gbif.org/.

[64] See http://cms.int/.

[65] See "Ramsar's Liquid Assets" commemorative book — 40 years of the Convention on Wetlands (2011).

[66] See http://ramsar.org.

United Nations Educational, Scientific and Cultural Organization

110. Proposals to conserve natural sites along with cultural sites were presented to the United Nations Conference on Human Environment, held in Stockholm in 1972.[67] The Convention concerning the Protection of the World Cultural and Natural Heritage (the World Heritage Convention) was adopted by the General Conference of UNESCO in 1972 and entered into force in 1975. It has 187 States Parties. The World Heritage Committee established pursuant to article 8 of the Convention has developed operational guidelines for inscription of properties on the World Heritage List and the List of World Heritage in Danger. A number of marine areas are included on the lists. In addition, the World Heritage Marine Programme[68] aims to safeguard the world's marine cultural and natural heritage by assisting States Parties with the nomination of marine properties and with the effective management of those sites. The programme provides ongoing technical support that includes training workshops, fund-raising and designing and implementing projects targeting existing and potential marine sites.

111. The Man and the Biosphere Programme of UNESCO is an intergovernmental initiative launched in the early 1970s. It notably targets the ecological, social and economic dimensions of biodiversity loss. Over the years, the work of the Programme has concentrated on the development of the World Network of Biosphere Reserves, which are areas of terrestrial and coastal/marine ecosystems or a combination thereof, with interconnected functions such as the conservation of landscapes, ecosystems, species and genetic variation; development; and logistic support through research, monitoring, environmental education and training. There are 563 sites worldwide in 109 countries, a number of which encompass coastal and marine areas. Coastal marine biosphere reserves are reference sites for monitoring coastal and marine biodiversity, observing and measuring human impacts on the coastal/marine habitats and developing rigorous and innovative guidelines for their conservation and sustainable management.[69]

International Seabed Authority

112. In accordance with article 145 of the Convention on the Law of the Sea, the International Seabed Authority (the "Authority") is responsible for taking necessary measures, with respect to activities in the Area to ensure effective protection for the marine environment from harmful effects that may arise from such activities. The regulations on prospecting and exploration for polymetallic nodules and for polymetallic sulphides provide for the application by the Authority and sponsoring States of the precautionary approach, as reflected in principle 15 of the Rio Declaration. The Legal and Technical Commission of the Authority is also empowered to make recommendations to the Council on the implementation of that principle. The Sulphides Regulations, adopted in May 2010, include numerous provisions on the management of risks to biodiversity, including on special features, such as vulnerable marine ecosystems.[70]

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[67] See http://whc.unesco.org/en/convention.

[68] See http://whc.unesco.org/en/marine-programme/.

[69] See www.unesco.org/mab/wnbrs.shtml for a list of biosphere reserves.

[70] Authority contribution.

113. Environmental impact assessments have become one of the most effective and practical tools to support the implementation of sustainable development and figure significantly in the rules, regulations and procedure of the Authority.[71]

114. Furthermore, one of the operational objectives of the proposed environmental management plan throughout the Clarion-Clipperton Fracture Zone, which the Legal and Technical Commission will review during the seventeenth session of the Authority in 2011, is to undertake cumulative environmental impact assessments, as necessary, based on future exploitation proposals. In future, it is very likely that the regulations on the exploitation of polymetallic nodules and other resources such as polymetallic sulphides and cobalt crusts will include provisions on the obligation to undertake environmental impact assessments of the proposed activities by contractors.[72]

115. With regard to the establishment of marine protected areas, a proposal is under consideration by the Legal and Technical Commission for the establishment of a representative network of areas of environmental interest throughout the Clarion-Clipperton Zone provided by members of the Authority. That unprecedented initiative represents a considerable area covering approximately $4.5 \times 10^6 km^2$.[73]

2. Sustainable fisheries

116. Fisheries are a major contributor to economic development, food security and the cultural and social welfare of many countries. In 2008, capture fisheries and aquaculture production was approximately 142 million tons, of which marine capture production was 79.5 million tons.[74] Almost 81 per cent of world fish production was destined for human consumption and provided 3 billion people with at least 15 per cent of their animal protein. The share of fishery and aquaculture production entering international trade also increased from 25 per cent in 1976 to 39 per cent in 2008 and the value of world exports reached a record value of $102 billion.

117. Employment in fisheries and aquaculture has grown substantially in the past three decades, with an average rate of increase of 3.6 per cent per year since 1980. In 2008, 44.9 million people were employed in capture fisheries or in aquaculture, at least 12 per cent of whom were women. For each person employed in capture fisheries and aquaculture production, approximately three jobs are produced in secondary activities, with a total of more than 180 million jobs in the entire fish industry. Employment in the fisheries sector has grown faster than the world's population and faster than employment in traditional agriculture.

118. It remains the case, however, that the contribution of fisheries to sustainable development depends on the continuing health of functioning, productive ecosystems. Unfortunately, the proportion of marine fish stocks estimated to be underexploited or moderately exploited declined from 40 per cent in the mid-1970s to 15 per cent in 2008, and the proportion of overexploited, depleted or recovering stocks increased from 10 per cent in 1974 to 32 per cent in 2008. The need for improvements in oceans and fisheries governance, in particular the adoption and

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[71] Ibid. See also A/66/70, paras. 134, 153 and 154.

[72] Authority contribution.

[73] Authority contribution. See also ISBA/14/LTC/2 and A/66/70, para. 181.

[74] FAO, *The State of World Fisheries and Aquaculture 2010* (Rome, 2010).

implementation of integrated, ecosystem-based approaches relying on the best available science, has been widely recognized.[75]

119. The United Nations Conference on Environment and Development[76] and the World Summit[77] identified a wide range of challenges and corresponding actions for the sustainable use and conservation of marine living resources in areas under national jurisdiction and on the high seas. Despite actions taken by States and relevant organizations, many of these problems remain today, including illegal, unregulated and unreported fishing,[78] overfishing, overcapacity, inadequate flag State control, excessive by-catch and discards, inadequate data collection and reporting, lack of science, ineffective monitoring, control and surveillance, degradation of vulnerable marine ecosystems and the need for transfer of technology and capacity-building.

120. The following section highlights some of the significant achievements of the international community in implementing the outcomes of the major summits on sustainable development relating to sustainable fisheries, including some recent developments.

121. The General Assembly has adopted a wide range of decisions and recommendations relating to marine living resources, since as early as 1955. These decisions and recommendations have also involved the implementation of Chapter 17 of Agenda 21 and Chapter IV of the Johannesburg Plan of Implementation on the sustainable use and conservation of marine living resources in areas under national jurisdiction and in the high seas. Since 2003 (resolution 58/14), issues relating to the conservation and sustainable use of marine living resources have been consolidated and considered by the General Assembly in its annual resolutions on sustainable fisheries.

122. Recent efforts of the General Assembly have focused on addressing the impacts of bottom fishing on vulnerable marine ecosystems (see sect. IV, B, 6).[79] Reviews were conducted by the General Assembly in 2006 and 2009 on the actions taken by States and regional fisheries management organizations and arrangements to address the impacts of bottom fishing on vulnerable marine ecosystems. A further review will be conducted in 2011 with a view to ensuring effective implementation of the measures and to make further recommendations, where necessary.[80]

123. Issues relating to sustainable fisheries have also been considered by the Informal Consultative Process,[81] and the Working Group.[82] In particular, the Informal Consultative Process agreed at its sixth meeting on a wide range of elements relating to fisheries and their contribution to sustainable development,

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[75] See A/60/99, paras. 4 and 5 and World Bank, *The sunken billions: the economic justification for fisheries reform* (Washington, D.C., 2009).

[76] Agenda 21, chap. 17, paras. 17.44-17.96.

[77] Johannesburg Plan of Implementation (see note 9 above), chap. IV, paras. 30 to 32.

[78] A recent study estimated the cost of illegal, unregulated and unreported fishing to be $10 billion to $23.5 billion per year (D. J. Agnew, et al., "Estimating the worldwide extent of illegal fishing" available from www.plosone.org).

[79] Resolutions 59/25, 61/105 and 64/72.

[80] A/61/154 and A/64/305.

[81] A/57/80, A/58/95, A/59/122, A/60/99 and A/60/63, paras. 168-231.

[82] A/61/65, A/63/79 and A/65/88.

many of which were incorporated in the resolutions of the General Assembly on oceans and the law of the sea and on sustainable fisheries.[83]

The 1995 United Nations Fish Stocks Agreement

124. Articles 63 (2) and 64 of the Convention set out the overarching legal regime for the conservation and management of marine living resources including straddling fish stocks and highly migratory fish stocks. In the light of ongoing problems regarding the conservation and management of those stocks, Agenda 21 (chap. 17, para. 17.49 (e)) called for the convening of an intergovernmental conference under United Nations auspices to promote effective implementation of these provisions.

125. Pursuant to General Assembly resolution 47/192, the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks was convened in 1993 and completed its work in 1995 with the adoption of the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (the Agreement). The Agreement entered into force on 11 December 2001 and currently has 78 States parties, including the European Union.[84]

126. The Agreement sets out the legal regime for the conservation and management of straddling and highly migratory fish stocks, with a view to ensuring their long-term conservation and sustainable use. The conservation and management of such stocks must be based on the precautionary approach and the best scientific evidence available. The Agreement also elaborates on the fundamental principle established in the Convention that States should cooperate in taking the measures necessary for the conservation of those resources. Measures adopted for areas under national jurisdiction and established in the high seas are required to be compatible and mechanisms are provided for the compliance and enforcement of measures on the high seas. The Agreement also recognizes the special requirements of developing States, including in the development of their own fisheries and in their participation in high seas fisheries for such stocks.[85]

127. In 2006, in accordance with article 36 of the Agreement, a Review Conference was convened to assess the effectiveness of the Agreement and its provisions in securing the conservation and management of straddling fish stocks and highly migratory fish stocks, and, if necessary, to propose means of strengthening the substance and methods of implementation of those provisions in order to better address any continuing problems in the conservation and management of those stocks.

128. The Review Conference addressed ways to give full effect to the Agreement, both through a substantive review and assessment and by agreeing on recommendations for strengthening the implementation of the Agreement. Those recommendations related to the conservation and management of stocks; mechanisms for international cooperation and non-members; monitoring, control and surveillance and compliance and enforcement; and developing States and

[83] A/60/99.

[84] See http://un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm.

[85] See www.un.org/Depts/los/convention_agreements/reviewconf/FishStocks_EN_B.pdf.

non-parties.[86] In regard to the latter, the Conference recommended that States exchanged ideas on ways to promote further ratification and accession to the Agreement through a continuing dialogue to address concerns raised by some non-parties.

129. In 2010, the resumed Review Conference conducted a review of the implementation of the recommendations adopted at the Review Conference in 2006 and adopted additional recommendations.[87] The Conference also recommended that the informal consultations of States Parties to the Agreement continued and that the Agreement be kept under review through a resumption of the Review Conference at a date not earlier than 2015.[88] In paragraphs 31 and 32 of its resolution 65/38 of 7 December 2010, the General Assembly encouraged accelerated progress by States and regional fisheries management organizations and arrangements regarding the recommendations adopted by the Review Conference in 2006 and 2010.

130. Pursuant to requests of the General Assembly, the Informal Consultations of States Parties to the Agreement were held on an annual basis between 2002 and 2010. The meetings have provided States with a forum to discuss issues relating to the implementation of the Agreement and to take preparatory steps for the Review Conference and the resumed Review Conference.

131. The Informal Consultations have also contributed to the consideration by the General Assembly of its agenda item on oceans and the law of the sea. Specific outcomes of the meetings of the Informal Consultations have included: recommendations on the establishment of the Assistance Fund under Part VII of the Agreement; development and adoption of terms of reference for the Assistance Fund; consideration and adoption of preparatory documents for the Review Conference in 2006 and the resumed Review Conference in 2010; and a continuing dialogue, in particular with developing States, to promote a wider participation in the Agreement.

The Food and Agriculture Organization of the United Nations

132. The Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (the Compliance Agreement) was adopted in 1993 and entered into force in 2003. The aim of the Compliance Agreement is to strengthen compliance with conservation and management measures in the high seas by setting out the responsibilities of flag States and by strengthening international cooperation and transparency in the exchange of information. In particular, the Compliance Agreement seeks to encourage States to take effective action, consistent with international law, to deter the reflagging of vessels (see also sect. IV, B, 2).[89]

133. The FAO Code of Conduct for Responsible Fisheries and related International Plan of Actions was adopted as a voluntary instrument following the 1992 International Conference on Responsible Fishing and the United Nations Conference on Environment and Development. The Code established principles for

[86] A/CONF.210/2006/15, annex; A/61/63/Add.1, paras. 151 to 160.

[87] A/CONF.210/2010/7, annex.

[88] A/65/69/Add.2, paras. 10 and 11.

[89] General Fisheries Commission for the Mediterranean, *Studies and Reviews No. 76 (2005)* (Rome, 2005).

responsible fishing and fisheries activities, taking into account relevant biological, technological, economic, social, environmental and commercial aspects, and promotes the contribution of fisheries to food security and food quality. The Code also seeks to promote and facilitate structural adjustment in the fisheries sector so that fisheries are utilized in a long-term sustainable and responsible manner for the benefit of present and future generations.[90] The Code is global in scope and is directed towards a number of stakeholders, including regional fisheries management organizations and arrangements.[91]

134. The Code of Conduct is complemented by four international plans of action: the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing; the International Plan of Action for reducing Incidental Catch of Seabirds in Longline Fisheries; the International Plan of Action for the Conservation and Management of Sharks; and the International Plan of Action for the Management of Fishing Capacity. The international plans of action are non-binding instruments that are elaborated within the framework of the Code of Conduct and apply to all States, entities and fishers.

135. The Kyoto Declaration and Plan of Action was adopted by the International Conference on the Sustainable Contribution of Fisheries to Food Security in 1995. It recognized the important role played by fisheries and aquaculture in providing food security, both through food supplies and through economic and social well-being.[92] The Declaration called for actions to be taken in conserving and managing fishery resources and fisheries including, inter alia, actions for the effective implementation of the FAO Code of Conduct for Responsible Fisheries, strengthening scientific research for sustainable development of fisheries and aquaculture, assessing stock productivity and adjusting fishing capacity to a level commensurate with long-term stock productivity and increasing the available supply of fish and fishery products for human consumption.[93]

136. The FAO Strategy for Improving Information on Status and Trends of Capture Fisheries was adopted in 2003 as a non-binding instrument.[94] Its main objective was to provide a practical framework, strategy and plan for the improvement of knowledge and understanding of fishery status and trends as a basis for fisheries policymaking and management for the conservation and sustainable use of fishery resources within ecosystems. The Strategy provides guiding principles for implementation arrangements and sets forth objectives and required actions defining the roles of different stakeholders, with the primary emphasis on the need for capacity-building in developing countries. The "FishCode-STF Project" was formulated under the FAO FishCode Programme to support the implementation of the Strategy globally.[95]

137. In 2009, the FAO Committee on Fisheries approved the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated

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[90] See www.fao.org/fishery/en.

[91] FAO Code of Conduct, art. 1.2.

[92] A/60/63, para. 191.

[93] FAO, *Sustainable contribution of fisheries to food security* (Bangkok, 2000), available from http://fao.org/docrep/003/x6956e/x6956e00.htm.

[94] Available from http://fao.org/DOCREP/006/Y4859T/Y4859T00.htm.

[95] More information available from www.fao.org/fishery/fishcode-stf/en.

Fishing.[96] Its objective is to prevent, deter and eliminate illegal, unreported and unregulated fishing through the implementation of effective port State measures to ensure the long-term conservation and sustainable use of living marine resources and marine ecosystems.

138. In order to prevent illegally caught fish from entering the international market, the Agreement sets forth measures to be taken by port States in respect of foreign fishing vessels. At its sixty-fifth session, the General Assembly encouraged States to consider ratifying, accepting, approving or acceding to the Agreement on Port State Measures with a view to its early entry into force.[97]

139. The current FAO plan of action lays the foundation for an enhanced results-based approach to programme planning, implementation and reporting in the Organization. Principles and major elements of the approach include: (a) reduction of the absolute number of people suffering from hunger; (b) elimination of poverty and the driving forward of economic and social progress for all; and (c) sustainable management and utilization of natural resources for the benefit of present and future generations.[98]

140. Recent developments at FAO to achieve a comprehensive normative framework for sustainable fisheries have included the adoption of the International Guidelines for the Management of Deep-sea Fisheries in the High Seas in 2008 and adoption of the International Guidelines on Bycatch Management and Reduction of Discards in 2011. The former Guidelines were adopted to assist States and regional fisheries management organizations and arrangements in sustainably managing deep-sea fisheries in the high seas and provide advice on data and reporting, enforcement and compliance, management measures, conservation-related aspects, criteria for identification of vulnerable marine ecosystems and impact assessments.[99] A global database of information relevant to vulnerable marine ecosystems is also being developed and user-friendly species identification guides will be published to assist in improving information on deep-sea species.[100] A technical consultation will be held in May 2011 to consider the development of a new instrument on flag State performance. Approval has also been given to the development of a new international instrument on small-scale fisheries that would focus on the needs of developing countries. Efforts continue on the development and implementation of a global record of fishing vessels, refrigerated transport vessels and supply vessels.

Activities of other intergovernmental organizations at the international level

141. A number of other intergovernmental organizations and entities have actively contributed to the conservation and sustainable use of marine living resources since the United Nations Conference on Environment and Development, including the Convention on Biological Diversity, the Convention on International Trade in Endangered Species, the Organization for Economic Cooperation and Development (OECD), UNEP, UNESCO and WTO. In that regard, Agenda 21 recognized the

[96] Available from www.fao.org/Legal/treaties/037t-e.pdf.

[97] Resolution 65/38, para. 50.

[98] FAO contribution; see also FAO document COFI/2011/9.

[99] FAO, *The State of World Fisheries and Aquaculture 2010* (Rome, 2010), see also A/65/69/Add.2, paras. 175-177.

[100] FAO contribution.

importance of international and regional cooperation and coordination concerning the conservation and sustainable use of marine living resources.[101] It also recognized the importance of actions to strengthen cooperation and coordination between the numerous organizations, both within and outside the United Nations system, with competence in marine issues.[102]

142. The Conference of the Parties to the Convention on Biological Diversity, by decision X/2 of its tenth meeting, adopted a Strategic Plan for Biodiversity 2011-2020, including a target for 2020 by which all fish and invertebrate stocks and aquatic plants would be managed and harvested sustainably, legally and applying ecosystem-based approaches. For those purposes, the Convention on Biological Diversity has initiated cooperation with FAO, UNEP and other relevant intergovernmental and non-governmental organizations and entities in assessing the impacts of destructive fishing practices, unsustainable fishing and illegal, unregulated and unreported fishing on marine biodiversity and habitats.[103] The Conference of the Parties, by its decision X/29, also decided to continue its review on the impacts of unsustainable fishing, such as destructive fishing practices, overfishing, and illegal, unregulated and unreported fishing, on marine and coastal biodiversity and habitats.

143. By its resolution 14.2, the fourteenth Conference of the Parties to the Convention on International Trade in Endangered Species adopted a Strategic Vision for 2008-2013, which took into account the Millennium Development Goals and the outcomes of the World Summit to ensure that the Convention policy developments were mutually supportive of international environmental priorities. The secretariat of the Convention also continued to provide support for research as well as analysis of biological status and population distribution of specific species currently in trade or being considered for trade, and the identification of species that might qualify for and benefit from inclusion in the Convention's appendices (see also para. 106).[104]

144. In 2009, taking into account the World Summit commitment to maintain or restore depleted fish stocks to levels that can produce maximum sustainable yield levels by 2015, OECD decided to implement a project on the economics of rebuilding fisheries that focused on the key economic and institutional aspects of the rebuilding process. The major outcome of the project will be to provide practical and evidence-based advice on what policymakers need to do to ensure that stock rebuilding programmes succeed and have an economically positive contribution over the longer term.[105]

145. IOC has worked to strengthen regional cooperation and coordination between regional organizations and programmes, UNEP Regional Seas Programmes, regional fisheries management organizations and arrangements and other regional science health and development organizations. It launched a project on the sustainable management of the shared marine resources of the Caribbean Large Marine Ecosystems.[106]

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[101] Agenda 21, paras. 17.58-17.63 and 17.88-17.91.

[102] Agenda 21, chap. 17.F.

[103] UNEP/CBD/SBSTTA/14/INF/6.

[104] Contribution of the secretariat of the Convention on International Trade in Endangered Species.

[105] OECD contribution. Also see, OECD, *The Economics of Rebuilding Fisheries: Workshop Proceedings* (Paris, 2010).

[106] IOC contribution.

Developments at the regional level

146. Agenda 21 recognized the need for States to ensure cooperation and coordination between and within subregional, regional and global intergovernmental fisheries bodies. It also encouraged States to cooperate to establish such organizations where they did not exist.[107]

147. Since the United Nations Conference on Environment and Development and the adoption of the Agreement, greater attention has been given to the development of a coherent legal framework for the conservation and management of marine living resources on the high seas. In that regard, the Agreement, by its articles 8 and 10, identified regional fisheries management organizations and arrangements as the main mechanism for the adoption of conservation and management measures and set out an extensive list of functions to be performed by those organizations and arrangements, emphasizing their management role.

148. It is recognized, however, that there is a need to improve the functioning of those organizations and arrangements and thereby improve the governance of high seas fisheries. Many regional fishery management organizations and arrangements are not mandated to impose legally binding obligations and instead serve as scientific advisory bodies.[108] Some regional fisheries management organizations, despite having a management mandate, only have competence over specific species or are focused on a specific geographical area.

149. Recent efforts have been made to modernize the mandates of those organizations and arrangements, undertake performance reviews, establish new regional fisheries management organizations and arrangements and strengthen integration, coordination and cooperation, including with regional seas arrangements and other relevant organizations.[109] Regional fisheries management organizations and arrangements with the competence to regulate bottom fisheries have also taken actions to give effect to General Assembly resolutions 59/25 and 61/105 to address the impacts of such fisheries on vulnerable marine ecosystems.[110]

150. In recent developments, the International Commission for the Conservation of Atlantic Tunas reported that several commercially important tuna stocks were subject to recovery and rebuilding plans, with the allocation of fishing possibilities taking into account scientific advice, as well as the legitimate rights of developing States to develop their fisheries in the context of maintaining the stocks at maximum sustainable yield. In the future, the International Commission will consider the possibility of formalizing the implementation of the precautionary approach into the decision-making process.[111] The Commission for the Conservation of Antarctic Marine Living Resources has developed a three-year programme to support capacity-building and address issues associated with burden-sharing relating to science processes in the Commission.[112] The Inter-American Tropical Tuna

[107] Agenda 21, chap. 17, paras. 17.58-17.61.

[108] See A/60/99, para. 7 and A/CONF.210/2010/7, annex. See also, E. J. Molenaar, "New areas and gaps — How to address them" (2005), para. 3.

[109] See, A/60/99, A/CONF.210/2010/1, A/CONF.210/2010/7, annex and resolutions of the General Assembly on sustainable fisheries. For performance reviews, see A/CONF.210/2010/1, paras. 247-299.

[110] A/61/154 and A/64/305.

[111] International Commission for the Conservation of Atlantic Tunas contribution.

[112] Commission for the Conservation of Antarctic Marine Living Resources contribution.

Commission has established closed areas and seasons that apply to all fishing vessels for the purse seine fishery and it has prohibited trans-shipment at sea by purse seine vessels.[113]

3. Control of marine pollution

151. The United Nations Conference on Environment and Development recognized that the degradation of the marine environment could result from a wide range of land-based sources as well as sea-based activities, such as maritime transport, dumping at sea and oil and gas exploration and production. Agenda 21[114] and the Johannesburg Plan of Implementation[115] thus identified a number of challenges and set forth objectives, activities and means of implementation to protect the marine environment from such pollution.

152. In particular, Agenda 21 recommended that States apply preventive, precautionary and anticipatory approaches, ensure prior assessment of activities, integrate protection of the marine environment into relevant policies, develop economic incentives and other means consistent with the internalization of environmental costs and improve the living standards of coastal populations.[116] It was also agreed that the provision of additional financial resources and access to cleaner technologies and relevant research would be necessary to support actions by developing countries.

Pollution from land-based sources

153. Since the adoption of Agenda 21, the international community has developed legal and policy instruments and undertaken numerous activities at the global, regional and national levels to address marine pollution from land-based sources. Although some progress has been made, pollution from an ever-growing number of land-based activities continues to negatively impact the marine environment. Major categories of pollutants from land-based sources include sewage, persistent organic pollutants, radioactive substances, heavy metals, oils, nutrients, sediment mobilization, and marine litter.[117]

154. It is estimated that up to 80 per cent of marine pollution comes from land-based sources, such as industry, agriculture, urban development, mining, military activities, tourism and construction work. Although those activities are important contributors to national economic development, if not properly planned and managed, they can have profoundly negative consequences on the marine environment and, therefore, sustainable development.

155. Pollution from land-based sources primarily affects coastal areas, which are considered among the most productive marine areas. In particular, pollution from such sources impacts food security and poverty alleviation, public health,

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[113] Inter-American Tropical Tuna Commission contribution.

[114] Agenda 21, chap. 17, paras. 17.18-17.43.

[115] Johannesburg Plan of Implementation (see note 9 above), chap. IV, paras. 33-35.

[116] Agenda 21, chap. 17, para. 17.22.

[117] UNEP, *Protecting coastal and marine environments from land-based activities: A guide for national action* (2006), pp. 2-3.

ecosystems and ecosystem health and economic and social benefits and uses, including cultural values.[118]

156. At the global level, the legal regime, which largely predates Agenda 21, includes the general provisions for the protection of the marine environment from land-based sources of pollution set forth in Part XII of the Convention and a number of international instruments concluded to regulate specific types or sources of pollution, including the 1971 Ramsar Convention and the 2001 Stockholm Convention on Persistent Organic Pollutants.[119] States are currently negotiating a global legally binding instrument on mercury pursuant to a decision of the UNEP Governing Council in 2009 (see also para. 224 below).[120]

157. At the regional level, a number of instruments addressing pollution from land-based sources have been adopted since 1992, particularly in the context of the Regional Seas conventions. Examples include the 1995 Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities and the 2010 Protocol for the Protection of the Marine and Coastal Environment of the Western Indian Ocean from Land-Based Sources and Activities. The 1999 Protocol concerning Pollution from Land-Based Sources and Activities to the 1983 Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region also entered into force in July 2010. In addition, a number of other regional instruments address land-based sources of pollution in a more general manner.

158. The international legal framework is complemented by a strong policy framework based on non-binding global instruments that call for implementing actions at global, regional and national levels.

159. The 1985 Montreal Guidelines for the Protection of the Marine Environment from Land-Based Sources provided guidance on the development of appropriate bilateral, regional and multilateral agreements and national legislation for the protection of the marine environment against pollution from land-based sources. In paragraph 17.26 of Agenda 21, the UNEP Governing Council was invited to convene, as soon as practicable, an intergovernmental meeting on protection of the marine environment from land-based activities, building on these Guidelines.

160. Subsequently, the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities was adopted. The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities is a source of conceptual and practical guidance to be drawn on by national and/or regional authorities in devising and implementing sustained action to prevent, reduce, control and/or eliminate marine degradation from land-based activities. It sets forth actions to be taken at all levels to address land-based sources of pollution. The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities also indicates recommended approaches for dealing with nine specific types of pollution: sewage, persistent organic

[118] GESAMP, *Protecting the oceans from land-based activities* (2001), pp. 9-16.

[119] See also UNEP, *Protecting coastal and marine environments from land-based activities: A guide for national action* (2006), at pp. 8, 9, 14.

[120] See www.unep.org/hazardoussubstances/Mercury/Negotiations/tabid/3320/Default.aspx.

pollutants, radioactive substances, heavy metals, oils, nutrients, sediment mobilization, litter and physical alterations and destruction of habitats.[121]

161. As secretariat for the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, the UNEP's Marine and Coastal Ecosystem Branch assists States and intergovernmental organizations in the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, inter alia, through the preparation of guidance material, assessments and manuals as well as the provision of technical assistance and capacity-building. It works closely with the UNEP Regional Seas Office as well as the Regional Seas Programmes, which have spearheaded implementation efforts at the regional level.

162. The Branch also supports countries to develop and implement programmes of action at the national level by providing technical assistance. Those programmes of action should be comprehensive, continuing and adaptive, addressing cross-sectoral issues such as legislation, policies and financing, while implementing concrete activities to protect the marine environment.[122] Approximately 70 countries have developed, or are in the process of developing, a national plan for the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities.[123]

163. Implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities was reviewed in 2001 and 2006 and will be reviewed again in November 2011.[124] The second intergovernmental review of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities adopted the Beijing Declaration, which, inter alia, set out a new strategic direction for the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, as it gave greater emphasis to national and local level action, supported by calls for creating sustainable financial mechanisms, economic valuation of goods and services, participation by local stakeholders, and integrated approaches to management, in particular, linking freshwater and coastal management.[125] In response to paragraph 33 of the World Summit Political Declaration, the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities has narrowed its focus to give greater emphasis to municipal wastewater, the physical alteration and destruction of habitats, nutrients and marine litter.[126]

164. Since 2006, the Branch and its partners, including UNDP, GEF and the regional seas programmes, have focused efforts on addressing the priority areas identified during the second Intergovernmental Review, as well as continuing efforts to promote mainstreaming of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities into national development agendas and promoting integrated coast and river basin management. The Branch aims to ensure that efforts by national authorities to address land-based activities are well integrated into national development processes, including those supported by

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[121] UNEP contribution; see also UNEP(OCA)/LBA/IG.2/7.

[122] UNEP contribution.

[123] A/62/66/Add.1, para. 173.

[124] See www.gpa.unep.org/index.php?option=com_content&view=article&id=58&Itemid=53.

[125] See A/62/66, paras. 268-272.

[126] See UNEP, *The State of the Marine Environment: Trends and Processes* (2006).

the international donor community, United Nations Development Assistance Frameworks, and Poverty Reduction Strategies.

165. Some recent initiatives have featured in reports of the Secretary-General on oceans and law of the sea, including programmes to assess and address marine litter, the establishment of the Global Partnership on Nutrient Management and programmes aimed at improving wastewater management.[127]

Pollution from ships

166. International shipping is critical to sustainable development and underpins economic and social growth in many countries. More than 80 per cent of international trade in goods is carried by sea and an even higher percentage of developing-country trade is carried in ships. According to recent reports, however, many least developed countries remain isolated from major or frequent shipping routes.[128]

167. Impacts to marine environment stemming from shipping activities continue, particularly from oil pollution, air pollution and greenhouse gas emissions, chemical pollution and invasive alien species.

168. Numerous international legal and policy instruments have been developed since the United Nations Conference on Environment and Development to prevent, reduce and control pollution of the marine environment from ships.[129] As provided in article 194 of the Convention, those measures relate to the design, construction, equipment, operation and manning of vessels, ensuring the safety of operations at sea, preventing intentional and unintentional discharges, and preventing accidents and dealing with emergencies.[130]

169. The majority of these instruments have been developed by IMO, through the Maritime Safety Committee and the Marine Environment Protection Committee, but relevant instruments have also been developed by ILO, IHO and IAEA. A number of those instruments have yet to enter into force. Many of the policy instruments, including guidelines, standards and codes, have been developed with the important participation of industry and insurance associations.

170. A number of important instruments has been adopted by IMO since the United Nations Conference on Environment and Development in regard to safety of navigation and the prevention of marine pollution,[131] as well as in regard to liability

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[127] A/63/63/Add.1, paras. 157, 158 and 167-169; A/64/66/Add.1, paras. 226-231 and 387.

[128] See *Review of Maritime Transport 2010* of the United Nations Conference on Trade and Development, available from www.unctad.org.

[129] For example, since the adoption of the International Convention for the Control and Management of Ships' Ballast Water and Sediments in 2004, the Maritime Environment Protection Committee has produced and adopted fourteen sets of guidelines to assist in the implementation of this Convention. It has also adopted a set of guidelines for ballast water exchange in the Antarctic treaty area.

[130] See A/63/63, paras. 164-170, and A/57/57, paras. 277-346 and 373-401.

[131] Important IMO instruments include: (a) the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (London Protocol); (b) the Protocol of 1997 (Annex VI — Regulations for the Prevention of Air Pollution from Ships) to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto; (c) Protocol on Preparedness, Response and Cooperation to Pollution Incidents by Hazardous and Noxious Substances, 2000; (d) International

and compensation for pollution to the marine environment.[132] IMO has also adopted international instruments on the safety of fishing vessels, but these instruments have yet to enter into force.[133]

171. In regard to the transport of dangerous goods, relevant international instruments include the International Maritime Dangerous Goods Code and the International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships, which are now both mandatory under the International Convention for the Safety of Life at Sea, as well as the IAEA Regulations for the Safe Transport of Radioactive Material.

172. Global conventions adopted by ILO to regulate labour standards and the safe operation of vessels include the Maritime Labour Convention, 2006 and the Work in Fishing Convention, 2007 (No. 188). Legal instruments to prevent pollution of the marine environment from shipping have also been adopted at the regional level, in particular in the context of the UNEP Regional Seas Programme (see para. 73).

173. In order to regulate pollution from ships in particularly sensitive sea areas, special areas and emission control areas have been established. Particularly sensitive sea areas must have certain significant ecological, socio-economic or scientific attributes and must be vulnerable to damage by international shipping activities.[134] There must also be at least one associated protective measure with an identified legal basis that can be adopted by IMO to prevent, reduce, or eliminate risks from these activities.[135]

174. Under the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), particularly sensitive areas must also satisfy specific criteria relating to oceanographical and ecological conditions and to sea traffic. When approved by IMO, special areas are provided through mandatory regulations with a higher level of protection from operational discharges than other areas of the sea.

Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001; (e) International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (yet to enter into force); (f) Nairobi International Convention on the Removal of Wrecks, 2007 (yet to enter into force); (g) Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 (yet to enter into force). The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers was also amended in 1995 and 2010.

[132] These include: (a) the Protocol of 1992 to amend the International Convention on Civil Liability for Oil Pollution Damage, 1969; (b) the International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001; (c) Protocol of 1992 to amend the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971; (d) the Protocol of 2003 to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992; and (e) International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996 and its 2010 Protocol (yet to enter into force).

[133] For example, the 1993 Torremolinos Protocol relating to the 1977 Torremolinos International Convention for the Safety of Fishing Vessels and the International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel, 1995.

[134] Revised guidelines for the identification and designation of Particularly Sensitive Sea Areas (IMO resolution, A/982(24)).

[135] IMO contribution.

175. In 1997, annex VI was added to MARPOL 73/78 on regulations for the prevention of air pollution from ships, which sought to minimize airborne emissions from ships, including sulphur oxides and nitrogen oxides, and their contribution to pollution. Following its entry into force in 2005, a revised annex VI was adopted in 2008 with the aim of significantly strengthening the applicable emission limits. The revised annex contained a progressive reduction in emissions from ships and provided for the designation of emission control areas. The revised annex VI and the associated nitrogen oxides Technical Code 2008 entered into force on 1 July 2010.[136]

176. IMO coordinates and manages environmental programmes and delivers national and regional activities connected to the protection of the marine environment through its Integrated Technical Cooperation Programme.[137] The Programme was created to assist countries in developing human resources and institutional capacities for uniform and effective compliance with the IMO regulatory framework and helps countries ensure safe, secure and effective shipping services and protect their waters and coasts from environmental degradation caused by ships and other maritime-related activities.

177. In 2007, the IMO Assembly adopted resolution A.1006(25) on the linkage between the Integrated Technical Cooperation Programme and the Millennium Development Goals which, inter alia, invited Member States and donor organizations to recognize the importance of building maritime capacity in achieving the Millennium Development Goals and to ensure that consideration was given to the inclusion of the maritime sector in official development assistance programmes. It also requested IMO to give high priority to those activities that not only promote the early ratification and effective implementation of IMO global instruments, but also contribute to the attainment of the Millennium Development Goals, taking into account the special needs of small island developing States and the least developed countries, as well as the particular maritime transport needs of Africa.[138]

Other sources of pollution

178. In addition to shipping, degradation of the marine environment can result from other sea-based activities, such as dumping, oil and gas exploration and development, and deep seabed mining. In regard to dumping, Agenda 21, by its paragraph 17.30.B, recommended that States support wider ratification, implementation and participation in relevant Conventions on dumping at sea and encouraged the Parties to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention) to take appropriate steps to stop ocean dumping and incineration of hazardous substances. By its paragraph 17.30.C, Agenda 21 also addressed offshore oil and gas platforms and recommended that States assess existing regulatory measures to address discharges, emissions and safety and to assess the need for additional measures.

179. The London Protocol was adopted in 1996 in order to modernize and eventually replace the London Convention. It entered into force in 2006 and

[136] A/65/69/Add.2, paras. 248-250.
[137] IMO contribution.
[138] IMO contribution.

represented a major change of approach to the regulation of the sea as a depository for waste materials by stressing the precautionary approach.

180. Under the Protocol, all dumping is prohibited, except for possibly acceptable wastes on a so-called "reverse list". Appropriate preventative measures are to be taken when wastes or other matter introduced into the marine environment are likely to cause harm even when there is no conclusive evidence to prove a causal relation between inputs and their effects. There are currently 39 Parties to the Protocol.[139]

181. The governing bodies of the London Convention and the London Protocol have adopted a number of guidelines for assessing the impact of human activities on the marine environment and address all waste streams that may be considered for dumping at sea. Recent attention has focused on the impact on the marine environment of iron fertilization (see para. 202 below).[140]

182. In the wake of the Deepwater Horizon and Montara incidents, international attention has focused on the need to prevent pollution of the marine environment from offshore oil and gas exploration and development. IMO has already developed a comprehensive regime covering the prevention of oil pollution from ships, including in regard to liability and compensation (see paras. 166-177 below), however, the relevant instruments do not currently cover pollution damage caused by offshore exploration and exploitation activities.

183. At the 2010 meeting of the Legal Committee of the IMO, a proposal was made to add a new work programme item to address liability and compensation issues connected with transboundary oil pollution damage resulting from offshore oil exploration and exploitation.[141] The IMO Strategic Plan did not cover pollution caused by offshore oil exploration and exploitation activities.[142] Accordingly, the Legal Committee approved a proposal to recommend that the Council, and through it, the Assembly, revise the Strategic Plan.

184. The International Seabed Authority has been developing rules, regulations and procedures concerning the prospecting, exploration and exploitation of marine minerals in the Area which, inter alia, aim at ensuring an environmentally sustainable development of seabed mineral resources therein.[143] To date, these include the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area, adopted by the Authority on 13 July 2000, and the Regulations on Prospecting and Exploration for Polymetallic Sulphides, adopted by the Assembly of the Authority on 7 May 2010. At its seventeenth session, in 2011, the Authority will discuss the Draft Regulations on Prospecting and Exploration for Cobalt-Rich Crusts. The Authority has also organized scientific and technical workshops on the resources of the deep seabed and the marine environment to gather the scientific knowledge necessary to sustainably manage the resources of the Area.

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[139] See www.imo.org/About/Conventions/StatusOfConventions/Documents/Status%20-%202011.pdf.

[140] IMO contribution.

[141] Report of the Legal Committee at its ninety-seventh session, IMO document LEG 97/15, 14.5-14.13.

[142] Resolution A.1012(26).

[143] See http://isa.org.jm/en/documents/mcode.

Recent developments

185. At its tenth meeting, held in 2010, the Conference of the Parties to the Convention on Biological Diversity adopted a new strategic plan for biodiversity with a number of targets relevant to the prevention of pollution of the marine environment. The target of the plan was to bring pollution, including from excess nutrients, to levels that were not detrimental to ecosystem function and biodiversity by 2020. In addition, invasive alien species and pathways would be identified and prioritized. Measures would be in place to manage pathways to prevent their introduction and establishment (decision X/2, annex).

186. In regard to invasive alien species, IOC reported that it was working with the International Council for the Exploration of the Sea and IMO to develop ballast water sampling guidelines, a code of best practice for hull fouling and a code of best practices for port sampling.[144]

187. IHO highlighted the importance of hydrographic data, information and products such as nautical charts to maritime trade and sustainable development, including in the construction and maintenance of ports, harbours and other maritime facilities, marine tourism, fishery and aquaculture industries and coastal zone management. It supported and contributed to the establishment of hydrographic offices, especially for developing countries and small island developing States, including in the provision of necessary technology and products.[145]

4. Climate change

188. Since the adoption of the outcomes at the Conference on Environment and Development and the World Summit, the international community has continued to debate the implications of climate change for sustainable development. Many of those discussions have taken place in the context of the United Nations Framework Convention on Climate Change (the Framework Convention).[146] At its meeting in Cancun in 2010, the Conference of the Parties to the Framework Convention stressed the challenge that developing countries in particular faced in dealing with climate change while striving to attain sustainable development. The Johannesburg Plan of Implementation, in its chapter IV, paragraph 38, specifically called for actions at all levels to, inter alia, meet the commitments and obligations under the Framework Convention and work cooperatively towards achieving its objectives.[147]

189. The international community has come to recognize the important role of the oceans in the climate system and the impact that climate and atmospheric changes can have on marine biodiversity and ecosystems and, consequently, sustainable development. It has been estimated, for example, that 55 per cent of atmospheric carbon captured by living organisms is captured by marine organisms, of which between 50 and 71 per cent is captured by the marine vegetated habitats, including mangroves, salt marshes, seagrasses and seaweed.[148] Certain practices relating to terrestrial and marine resources and land use can decrease greenhouse gas sinks and

[144] IOC contribution.

[145] IHO contribution.

[146] Further information available from http://unfccc.int/essential_background/convention/items/2627.php.

[147] See also Agenda 21, chap. 9, para. 9.2.

[148] IOC contribution. See also UNEP, *Blue Carbon: A Rapid Response Assessment* (2009), available from www.grida.no/files/publications/blue-carbon/BlueCarbon_screen.pdf.

increase atmospheric emissions and loss of biological diversity can reduce the resilience of ecosystems to climatic variations.[149]

190. The following section highlights major actions taken to increase understanding of the impacts of climate change on the oceans. It also provides an overview of actions taken to mitigate such impacts and adapt to the projected impacts of climate change on the oceans.

Understanding the impacts of climate change on the oceans

191. Significant efforts have been made since the adoption of Agenda 21 to improve the understanding of processes that influence and are influenced by the Earth's atmosphere, including economic and social processes, build capacity, enhance international cooperation and improve understanding of the economic and social consequences of atmospheric changes and of mitigation and response measures addressing such changes.[150] Important in that regard has been the development of research to better understand the impacts of climate change on the oceans, including rising sea levels, melting Arctic sea ice, ocean acidification, loss of marine biodiversity, extreme weather events and shifts in distribution of marine species.[151]

192. The work of the Intergovernmental Panel on Climate Change has been particularly significant in the preparation of comprehensive assessments of scientific, technical and socio-economic information relevant for the understanding of climate change and its potential impacts, as well as options for mitigation and adaptation.[152] The Fifth Assessment Report of the Panel, which is scheduled to be completed in 2014, will put greater emphasis on assessing the socio-economic aspects of climate change and implications for sustainable development, risk management and the framing of a response through both adaptation and mitigation.[153]

193. In regard to fisheries, the International Council for the Exploration of the Sea indicated that an increase in sea temperature in the medium and long term could lead to changes in the migrations of major fish stocks in the North East Atlantic Fisheries Commission Convention area. Changes in migration or spawning behaviour could affect catch rates, or cause populations to shift from areas where spatial restrictions are in place or across maritime boundaries with different quotas.[154]

194. Particular concerns have been raised over the impacts of ocean acidification on the marine environment and marine biodiversity,[155] including by altering species composition, disrupting marine food webs and ecosystems and potentially damaging fishing, tourism and other human activities connected to the seas.[156] Further

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[149] Agenda 21, chap. 9, para. 9.19. Also see the Johannesburg Plan of Implementation (see note 9 above), chap. IV, para. 38.

[150] Ibid., paras. 9.6 and 9.7.

[151] See A/65/69/Add.2, paras. 374-377, A/65/69, paras. 209-218, A/64/66/Add.1, paras. 342-348, A/63/63, paras. 358 and 359, A/62/66/Add.1, paras. 228-235, and A/62/66, paras. 327-330.

[152] See http://ipcc.ch/index.htm.

[153] See http://ipcc.ch/activities/activities.shtml.

[154] NEAFC contribution. Also see, *ICES Cooperative Research Report No. 301* (May 2010), available from http://ices.dk/pubs/crr/crr301/CRR%20301-Web-100531.pdf.

[155] A/65/69/Add.2, paras. 374-377.

[156] See UNEP, *Emerging Issues: Environmental Consequences of Ocean Acidification: A Threat to*

research is needed to develop meaningful projections of the impacts of ocean acidification on marine ecosystems and fisheries and to identify thresholds beyond which marine ecosystems may not be able to recover. In that regard, the 2008 Monaco Declaration recommended promoting research to better understand the impacts of ocean acidification on marine ecosystems, develop linkages between economists and scientists to evaluate the socio-economic impacts, improve communication between policymakers and researchers and consider the effect of increased levels of atmospheric carbon dioxide on the radiation balance of the Earth and the negative impact on ocean chemistry and ecosystems in climate change negotiations.[157]

195. In 2010, the Conference of the Parties to the Convention on Biological Diversity, in its decision X/13, recognized that ocean acidification met the criteria for consideration as a new and emerging issue and requested the Subsidiary Body for Scientific, Technical and Technological Advice to consider the impacts of ocean acidification on marine biodiversity and habitats as part of the programme of work on marine and coastal biological diversity.

196. The United Nations Conference on Environment and Development had recognized that systematic collection of data on the marine environment was needed to apply integrated management approaches and predict the effects of global climate change on living marine resources and the marine environment. It highlighted, in particular, the need for a long-term cooperative research commitment to provide the data required for global climate models and reduce uncertainty.[158]

197. IOC continues to lead the coordination of the Global Ocean Observing System in concert with WMO, UNEP and ICSU (see paras. 213-216).[159] The future workplan of the System will include emerging essential climate variables on ocean chemistry and ecosystems, which will be relevant in tracking the impacts of climate change and acidification on ocean ecosystems.[160]

Mitigating the impact of climate change from ocean-related activities

198. The following section highlights significant actions taken to reduce greenhouse gas emissions from ships and regulate ocean fertilization and carbon sequestration.[161]

199. In addition to the development of comprehensive studies,[162] actions taken by IMO to reduce greenhouse gas emission from ships have included the development of technical and operational measures for international shipping.[163]

Food Security (2010), available from www.unep.org/dewa/pdf/Environmental_Consequences_of_Ocean_Acidification.pdf.

[157] IOC contribution. Also see the Monaco Declaration, available from www.ocean-acifiifcation.net/symposim2008/MonacoDeclaration.pdf; A/64/66/Add.1, para. 345.

[158] Agenda 21, chap. 17, paras. 17.97-17.98. See also Johannesburg Plan of Implementation (see note 9 above), chap. IV, para. 38.

[159] IOC contribution.

[160] UNFCCC contribution.

[161] Agenda 21, chap. 17, paras. 17.30-17.43; Johannesburg Plan of Implementation (see note 9 above), chap. IV, paras. 34-35.

[162] A/64/66/Add.2, para. 71. See also IMO, *Second IMO Greenhouse Study 2009* (London, 2009).

[163] For recent developments, see A/65/69/Add.2, paras. 379-381, A/64/66/Add.2, paras. 71-72, and A/64/66/Add.1, paras. 349-353.

200. At its most recent meeting in 2010,[164] the Marine Environment Protection Committee of IMO discussed the possibility of amending MARPOL Annex VI to make mandatory for new ships its Energy Efficiency Design Index[165] and its Ship Energy Efficiency Management Plan.[166] Proposed amendments were subsequently circulated and will be considered for adoption by the Protection Committee in July 2011.[167] It also continued to discuss the development of market-based measures as a possible mechanism to reduce greenhouse gas emissions from international shipping, including a proposed levy on all carbon dioxide emissions from international shipping, or from ships not meeting energy efficiency requirements.

201. In the context of the Framework Convention, the Subsidiary Body for Scientific and Technological Advice receives periodic updates from IMO on developments in reducing greenhouse gas emissions from ships. The issue has also been discussed under the Ad Hoc Working Group on Long-term Cooperative Action in the context of cooperative sectoral approaches and sector-specific actions in order to enhance implementation of the Framework Convention. These ongoing discussions have focused on how to define the roles of, and links between, the processes under the Framework Convention and IMO.[168]

202. Although ocean fertilization has the potential to enhance the growth of plankton and consequently increase the uptake of carbon dioxide in the oceans, numerous concerns have been expressed over the possible impacts of ocean fertilization on the marine environment.[169] A number of intergovernmental bodies, including the Contracting Parties to the London Convention and the Contracting Parties to the London Protocol, have adopted decisions to disallow ocean fertilization activities other than legitimate scientific research (see para. 101 above).[170] Additional efforts are being made in the context of the London Convention and the London Protocol to develop a global regulatory mechanism for ocean fertilization activities.[171]

203. Amendments to the London Protocol entered into force in 2007 to allow the capture and storage of carbon dioxide in sub-seabed geological formations for long-term isolation from the atmosphere.[172] In 2009, the Contracting Parties to the London Protocol adopted an amendment to article 6 of the London Protocol to allow the export of carbon dioxide streams for the purpose of storage in transboundary sub-seabed geological formations, which has yet to enter into force.[173] A review is

[164] See MEPC report on its sixty-first session, IMO document, MEPC 61/24.

[165] See Interim Guidelines on the Method of Calculation of the Energy Efficiency Design Index for New Ships, IMO document MEPC.1/Circ.681.

[166] See Guidance for the Development of a Ship Energy Efficiency Management Plan, IMO document MEPC.1/Circ.683.

[167] See www.imo.org/MediaCentre/PressBriefings/Pages/GHG-amendments-circulated.aspx.

[168] Contribution of the secretariat of the United Nations Framework Convention on Climate Change.

[169] See IOC report "A Scientific Summary for Policymakers on Ocean Fertilization" available from, http://unesdoc.unesco.org/images/0019/001906/190674e.pdf; see also CBD document UNEP/CBD/SBSTTA/14/INF/7 and IMO document LC 30/INF.4 and Add.1.

[170] See IMO resolution LC-LP.1 (2008) and decision IX/16 C of the Conference of the Parties to the Convention on Biological Diversity. See also A/65/69/Add.2, paras. 382-383 and A/64/66/Add.2, paras. 87-88.

[171] IMO contribution, IMO document LC 32/15 and resolution LC-LP.2 (2010).

[172] IMO resolution LP.1(1).

[173] IMO resolution LP.3(4) and A/65/69/Add.2, paras. 384-385.

currently being conducted of the 2007 Specific Guidelines for Assessment of Carbon Dioxide Streams for Disposal into Sub-seabed Geological Formations, in the light of the amendments to article 6, with a view to its completion in 2012.[174]

Adapting to climate change

204. Significant efforts have been made by the international community, in particular by coastal communities, to adapt to the current and projected impacts of climate change on the oceans.[175] In the light of Agenda 21,[176] many of those activities have also focused on the importance of marine and coastal biodiversity and the need for ecosystem-based adaptations strategies.

205. At its most recent meeting, the 2010 Conference of the Parties to the Framework Convention in Cancun agreed that enhanced international cooperation and enhanced action on adaptation were urgently required to support and enable adaptation implementation to reduce vulnerability and build resilience in developing countries, taking into consideration, inter alia, vulnerable ecosystems. In addition, at the outcome of the Ad Hoc Working Group on Long-term Cooperative Action, all Parties were invited to enhance action on adaptation under the Cancun Adaptation Framework. The need to strengthen international cooperation and expertise was also recognized.[177]

206. The new strategic plan for biodiversity adopted by the Conference of the Parties to the Convention on Biological Diversity in 2010 recognized that protection of biodiversity would help slow climate change by enabling ecosystems to store and absorb more carbon and help people adapt to climate change by adding resilience to ecosystems and making them less vulnerable. In terms of specific actions, it was decided that, by 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks would be enhanced through conservation and restoration, including the restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation.[178]

207. FAO recently initiated the development of the Global Partnership on Climate, Fisheries and Aquaculture, a voluntary partnership comprising 20 international organizations and sector bodies with a focus on climate change interactions with global waters and living resources and their resulting social and economic consequences.[179] Issues relating to climate change impacts, adaptation and mitigation in the context of fisheries and aquaculture were also considered by the twenty-ninth session of the FAO Committee on Fisheries in 2011.

5. Marine science and transfer of marine technology

208. Marine science and its supporting technologies, through improved knowledge and their application to management and decision-making, can make a major contribution to eliminating poverty, ensuring food security, supporting human

[174] IMO documents LC 29/17, annex 4, and LC 32/15.

[175] A/65/69/Add.2, paras. 386-392 and A/64/66/Add.1, paras. 358-361.

[176] Agenda 21, chap. 9, paras. 9.19-19.20. See also Johannesburg Plan of Implementation (see note 9 above), chap. IV, para. 38.

[177] Contribution of the secretariat of the United Nations Framework Convention on Climate Change.

[178] Convention on Biological Diversity decisions X/2, annex and X/33.

[179] FAO document COFI/2011/6.

economic activity, conserving the world's marine environment and helping predict and mitigate the effects of and responses to natural events and disasters. Marine science can also assist in generally promoting the use of the oceans and their resources to achieve sustainable development.

209. Agenda 21 recommended States to consider supporting the role of international organizations in the collection, analysis and distribution of data and information from the oceans and all seas. The Johannesburg Plan of Implementation underlined the importance of building capacity in marine science. It also stressed the need to increase scientific and technical collaboration, including the appropriate transfer of marine science, technologies and techniques for the conservation and management of living and non-living marine resources. The Mauritius Strategy of Implementation (see sect. III, D below) called upon the international community to provide technical and financial support for IOC's marine science programmes that are of particular relevance to small island developing States.

210. Marine science and technology is a cross-cutting issue that has consistently been on the agenda of the meetings of the Informal Consultative Process and the General Assembly, which continues to stress the importance of increasing the scientific understanding of the marine environment, particularly the deep sea, and its vulnerable marine ecosystems. International support should better coordinate research, foster collaboration and dialogue, build partnerships and improve international governance, including reform of the Bretton Woods Institutions.[180] Global science organizations, in cooperation with Governments and relevant entities within the United Nations organization, are taking steps to enhance the delivery of data, information and understanding on sustainable development challenges and on solutions, but these efforts need additional resources. In its decision 7/1 (see para. 48), the Commission on Sustainable Development emphasized that scientific understanding of the marine environment, including marine living resources and the effects of pollution, is fundamental to sound decision-making, including with regard to the interaction between atmospheric and oceanic systems.

Mechanisms of cooperation and coordination in marine science

Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization

211. While a number of organizations are involved in carrying out marine scientific research and related activities under their respective mandates, IOC is recognized as the competent international organization with regard to marine scientific research in the Convention. It plays an important role in the implementation of Agenda 21 and the Johannesburg Plan of Implementation, as several of the provisions of the Plan address it directly. IOC has emerged as the international organization that coordinates marine scientific activities, ocean services and related capacity-building (see paras. 212-221 below). IOC contributes to the implementation of the Convention and has programmes in ocean science and technology.

Advisory Body of Experts on the Law of the Sea

212. To respond to the requirements deriving from the Convention relevant to research, transfer of marine technology and capacity-building, the IOC Assembly

[180] The World Bank and the International Monetary Fund.

established the Advisory Body of Experts on the Law of the Sea in 1999 to provide advice upon request to the governing bodies of IOC and to the Executive Secretary on the implementation of IOC responsibilities under the Convention. The Advisory Body of Experts, working in close cooperation with the Division for Ocean Affairs and the Law of the Sea has held 10 meetings and concluded work on three documents: IOC Criteria and Guidelines on Transfer of Marine Technology; Procedure for the Application of article 247 of the United Nations Convention on the Law of the Sea by the IOC; and Guidelines for the implementation of resolution XX-6 of the IOC Assembly regarding the deployment of profiling floats in the high seas within the framework of the Argo programme. At the forty-third meeting of the IOC Executive Council in 2010, the Advisory Body of Experts was requested to continue work on the questionnaire No. 3 on "The practices of Member States in the field of marine scientific research and transfer of marine technology" within the framework of the Convention.

Global ocean observation systems

213. Agenda 21 called for the establishment of a global ocean observation system that will enable effective management of the marine environment and sustainable utilization of its natural resources. IOC leads a partnership with WMO, UNEP and the International Council for Science to coordinate the implementation of the System, which is a permanent system for ocean observation and is built, maintained and upgraded with contributions from member States. The System consists of (a) an open ocean module with a focus on observations for climate services and science; and (b) a coastal module that focus on a broader suite of observations including socio-economic data. The System comprises remote sensing from satellites; coastal instruments including tide gauges; buoys, drifters and other platforms; ships of opportunity (including commercial ferries); and long time series records of variability. It produces data and information for users. Much of its implementation relies on the technical guidance provided by the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology. Sixty-two per cent of the foreseen observing network for the open ocean module of the System is in place (up from about 30 per cent at the Earth Summit). Components for drifting buoys and free-drifting profiling floats have met their initial design goals, though sustaining those systems remains a challenge. Considerable progress has also been seen for the global array of tide gauges largely driven by the increased focus on tsunami and other sea level hazard monitoring.

214. In its resolution XXIII-1, the IOC Assembly recognized that full implementation of the System requires the sustained operation of in situ and space-based systems that are being considered as an integral part of the global earth observations system of systems. The System faces the challenge of broadening the observation network from a limited set of physical observations to one that embraces biological and chemical variables to underpin assessment of the state of the oceans beyond climate, including, for example, carbon uptake, acidification, ecosystem change and biodiversity.

215. IOC reported that investments in the System over the past decade have stagnated. Capacity development will be critical and there is a need for the

international donor community including GEF to earmark funding for sustained coastal ocean observation and science activities.[181]

216. Establishment of a formal convention for the collection and exchange of essential ocean observations could further the development of the System.[182]

Harmful algal blooms

217. Following-up from the United Nations Conference on Environment and Development, IOC formed the Intergovernmental Panel on Harmful Algal Blooms in March 1991 to meet the scientific, managerial, and resource needs for implementation of a global harmful algal bloom programme. The Panel has met over ten times and continues to work on the development and implementation of a harmful algal bloom programme to foster the effective management of and scientific research on harmful algal blooms in order to understand their causes, predict their occurrences and mitigate their effects. In April 2011, the Panel meeting focused on capacity-building; the effects of harmful algae on human health, including the long-term effects of low-level exposure which are poorly understood; harmful algal events, coastal zone management and linkages with coastal eutrophication; and the effects of climate and global change on the occurrence and impact of blooms.

218. The Panel has a team acting as a focal and coordination point regarding interaction with the System, the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology, and the IOC Ocean-Related Hazards Early Warning System with respect to harmful algal bloom observations, forecasting and warning systems. With regard to data collection and sharing, the Panel is also working with International Oceanographic Data and Information Exchange on the development of a harmful algae information system designed to compile data on harmful events, the biogeography of harmful species and current monitoring and management systems worldwide, and to be a reference point for the usage of names of causative species.

Early warning systems

219. The reduction of risk from numerous coastal hazards, including tsunamis, storm surges or outbreaks of harmful algal blooms, is made possible through the installation and use of early warning systems to alert local populations of impending events. The Indian Ocean tsunami of 2004 and the recent earthquake in Japan particularly highlight to the international community the devastating effects of tsunamis and the need for early warning systems to prevent hazardous natural events from turning into humanitarian disasters. However, funding for tsunami early warning systems has shrunk, although tsunamis are increasingly being addressed as part of a multi-hazard approach.

220. Under the main leadership of IOC, a framework for an overall global system and warning systems for tsunamis and other coastal hazards have been established for the Indian Ocean, the Caribbean and adjacent seas, the North-eastern Atlantic, the Mediterranean and connected seas. The global drifting buoy array, Argo profiling floats and a substantial number of sea level stations have been upgraded to real time data delivery in support of tsunami warning systems. However, it has been

[181] IOC contribution.
[182] IOC contribution.

noted that sampling needs also to be increased to enhance early warning systems. IOC improves coastal mapping activities within States through capacity-building activities and by assisting national disaster agencies in developing targeted maps and services, including inundation maps and coastal ecosystem mapping.

The International Oceanographic Data and Information Exchange

221. The Exchange is an IOC programme. Its objectives are to (a) facilitate and promote the exchange of all marine data and information including metadata, products and information in real time, near real time and delayed mode; (b) ensure the long-term archiving, management and services of all marine data and information; (c) promote the use of international standards and develop or help in the development of standards and methods for the global exchange of marine data and information, using the most appropriate information management and information technology; (d) assist Member States to acquire the necessary capacity to manage marine data and information and become partners in the network; and (e) support international scientific and operational marine programmes of IOC and WMO and their sponsor organizations with advice and data management services. The data covered by the Exchange was substantially expanded by incorporating the Ocean Biogeographic Information System, an ongoing process. With a volume of data of 30 million records, covering 898 individual data sets and growing.

Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection

222. In furtherance of the need for a cross-sectoral, interdisciplinary and science-based approach to marine environmental affairs and the need to foster coordination and cooperation among United Nations agencies with relevant responsibilities, the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection was founded in 1967 as a joint advisory mechanism.[183] It provides advice to its sponsoring agencies on issues of interest upon request.[184] In recent years, following an in-depth internal review in 2001, the Group has undergone a modernization and revitalization process that led to the strengthening of its networks by increasing the number of developing country experts participating in its activities, and supported the participation of the Group in the Regular Process.[185] The capacity-building element was also built into its main activities.[186] The Group participated in the "Assessment of Assessments", conducting a review of existing global and regional marine assessments related to marine pollution, including ship-based pollution and atmospheric input to the oceans.[187]

223. The Group periodically produces a global report on issues regarding the degradation of the marine environment, providing advice in response to significant events involving risks to human health and marine ecosystems.[188] Its current programme relates to issues such as oil inputs into the sea from sea-based activities, environmental risk assessment and communication in coastal aquaculture, hazards

[183] More information available from http://gesamp.org.

[184] IMO, FAO, IOC, WMO, IAEA, the United Nations, UNEP, UNIDO and UNDP.

[185] Resolution 57/141 para. 45 and its reference to the Group.

[186] A/65/69, para. 278.

[187] A/63/63, para. 379.

[188] List of reports of the Group available from www.gesamp.org/publications.

of chemicals carried by ships, environmental exposure models for application in seafood risk analysis, and the use of science in marine environmental policy-making processes.

224. The Group's main functions also include the identification of new and emerging issues that threaten the marine environment. For example, in 2008, the Group issued a joint statement with the Scientific Committee on Oceanic Research on ocean fertilization or deliberate nutrient additions to the Ocean.[189] In its recent publication, the Group also highlighted the need to refocus on mercury in exploited fish species, identifying mercury as a cross-cutting issue in the Transboundary Waters Assessment Programme.[190]

Science, assessments and decision-making

225. Despite many successful and pioneering research initiatives, important gaps still exist in our understanding of the functioning of marine ecosystems and the status of the oceans globally. Assessments are important in order to better understand the status of and trends in the condition of ecosystems. In particular, assessments help gauge the vulnerability, resilience and adaptability of various ecosystems as well as the goods and services that they provide to the well-being and livelihood of people. Assessments also contribute to a better understanding of the manner and the extent to which human activities affect ecosystems and thus help identify appropriate management responses.

Intergovernmental science-policy platform on biodiversity and ecosystem services

226. The Johannesburg Plan of Implementation, by its paragraph 36, highlighted the need to improve the scientific understanding and assessment of marine and coastal ecosystems as a fundamental basis for sound decision-making. Consultations undertaken in 2005 to 2008 towards an International Mechanism of Scientific Expertise on Biodiversity and the global strategy for the follow-up to the Millennium Ecosystem Assessment (see para. 232 below) stressed the need for an intergovernmental science-policy platform on biodiversity and ecosystem services.[191] Marine and coastal biodiversity and ecosystem services are important for sustainable development and current and future human well-being, particularly with regard to poverty eradication. In 2010,[192] at an ad hoc intergovernmental and multi-stakeholders meeting, it was agreed to establish the Platform,[193] which would aim at strengthening the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development. It would identify key scientific information needed for policymakers; perform regular and timely assessments of knowledge; support policy formulation and implementation; and prioritize key capacity-building needs and catalyze financing for capacity-building activities.

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[189] Available from www.ocean-acidification.net/OAdocs/SCOR-GESAMP%20Press%20Release%204%20March%202008.pdf.

[190] GESAMP et al., *Proceedings of the GESAMP International Workshop on plastic particles as a vector in transporting persistent, bio-accumulating and toxic substances in the oceans* (Paris, 2010).

[191] See http://ipbes.net/.

[192] Decision SS.XI/4 of the Governing Council/Global Ministerial Environment Forum at its eleventh special session.

[193] See UNEP/GC.26/6, annex.

227. The outcome of the meeting was transmitted to the sixty-fifth session of the General Assembly, including its high-level segment on biological diversity, held on 22 September 2010 (A/65/383). The high-level segment noted the important linkage between scientific knowledge and effective policymaking and stressed the importance of establishing the platform.[194] Accordingly, the General Assembly, by its resolution 65/162 requested the Governing Council of UNEP to convene a plenary meeting to determine modalities and institutional arrangements for the platform at the earliest opportunity. In that regard, the UNEP Governing Council/Global Ministerial Environment Forum, at its twenty-sixth session, requested, by its decision 26/4, that UNEP convene such meeting later in 2011. It also requested UNEP to work in close cooperation with UNESCO, FAO and UNDP to ensure the proper implementation of the platform until the establishment of the secretariat of the platform. In that regard, UNEP was invited to submit an offer of interest in hosting and otherwise supporting the Secretariat of the Platform in the longer term.

UNEP and marine assessment

228. Since 2000, the World Conservation Monitoring Centre has provided UNEP with access to biodiversity information in support of decision-making. By its decision GC 22/1/III, the UNEP Governing Council mandated the Centre to provide a range of biodiversity-related services to UNEP, the biodiversity-related conventions and their constituent parties and other bodies in the non-governmental and private sectors. One of the Centre's main programmes is for Marine Assessment and Decision Support, which seeks to provide strategic scientific information to guide decisions affecting the marine and coastal environment. Among its activities, it has created and improved key marine and coastal data sets, which provide the knowledge base for decision-making. Those data sets include the Global and Regional Marine Assessment Database,[195] the World Database on Protected Areas-Marine, and the Global Coral Disease Database.[196] UNEP and the Centre also work to enable the integration and use of those data sets into relevant environmental and socio-economic assessments and decision support tools for better management of marine and coastal environments.

229. UNEP, in partnership with the Regional Seas Conventions and Action Plans, undertook the development of the Marine Biodiversity Assessment and Outlook Series that was launched at the tenth Conference of Parties to the Convention on Biological Diversity. Those assessments (19 regional reports) provided a perspective into the current state of marine biodiversity. The results indicate that marine biodiversity is currently under threat from different drivers of change such as land-based pollution, the overexploitation of fisheries, the introduction of marine

[194] See press release of the General Assembly, GA/10992 — ENV/DEV/1158, available from www.un.org/News/Press/docs/2010/ga10992.doc.htm.

[195] Developed as a collaboration between UNEP and the Centre, and IOC to support the Group of Experts established pursuant to General Assembly resolution 60/30 to carry out the "Assessment of Assessments" towards a regular process for the global reporting and assessment of the state of the marine environment, including socioeconomic aspects.

[196] Collaborative project between UNEP and the Centre, and the United States' National Oceanic and Atmospheric Administration — National Marine Fisheries Service.

invasive species and the growing effects of climate change, including ocean acidification.[197]

Global International Water Assessment

230. Between 1999 and 2006, the UNEP Global International Water Assessment was tasked to prepare comprehensive strategic assessments of global international water bodies to determine the root causes of the environmental degradation. The Water Assessment would also provide concrete proposals for their sustainable use and development.[198]

231. Over its seven years of existence, the Water Assessment produced integrated assessments on all of its targeted 66 transboundary marine water bodies. The Water Assessment also provided scientific and data analysis that could be used by other international, regional and global bodies and activities in the field of international waters in support of their analyses or sustainable development activities.

Millennium Ecosystem Assessment

232. Initiated in 2001 and completed in 2005, the Millennium Ecosystem Assessment was intended to assess the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems and their contribution to human well-being.[199] The findings of the Millennium Ecosystem Assessment provided a scientific appraisal of the condition and trends in the world's ecosystems, including marine ecosystems, and the services they provide and options to restore, conserve or enhance their sustainable use.[200]

D. Small island developing States

233. Agenda 21, in its paragraph 17.124, states that "Small island developing States and islands supporting small communities are a special case both for environment and development. They are ecologically fragile and vulnerable. Their small size, limited resources, geographic dispersion and isolation from markets, place them at a disadvantage economically and prevent economies of scale". They are, by their very nature, highly dependent on oceans and seas for the livelihoods of their people, while also remaining extremely vulnerable to sea-level rise and the adverse effects of climate change, pollution and other stresses on oceans and marine resources.

234. While small island developing States share many of the characteristics of other developing countries, they face unique challenges which are widely recognized. The special case of small island developing States within the context of sustainable development was first formally acknowledged by the international community at UNCED in 1992 (see paras. 18, 310-314).

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[197] UNEP contribution.

[198] See hqweb.unep.org/dewa/giwa/.

[199] See www.maweb.org/en/About.aspx#1 and www.maweb.org/en/Partners.aspx.

[200] The products of the Millennium Ecosystem Assessment are available at www.maweb.org/en/Reports.aspx.

235. Since UNCED, a number of international frameworks, as outlined below, were established that seek to address the limitations faced by small island developing States in achieving sustainable development.

I. Policy framework

Barbados Programme of Action

236. The United Nations Global Conference on the Sustainable Development of small island developing States, held in Barbados in 1994, reaffirmed the principles and commitments to sustainable development embodied in Agenda 21 and translated them into specific policies, actions and measures to be taken at the national, regional and international levels to enable small island developing States to achieve sustainable development. The Conference adopted the Barbados Programme of Action for the Sustainable Development of SIDS (Barbados Programme of Action), a 14-point programme that identifies priority areas and specific actions necessary for addressing the special challenges faced by small island developing States. The Barbados Programme of Action further identified cross-sectoral areas requiring attention: capacity-building; institutional development at the national, regional and international levels; cooperation in the transfer of environmentally sound technologies; trade and economic diversification; and finance.

237. The Barbados Programme of Action highlighted the special challenges and constraints that cause major setbacks to the socio-economic development of small island developing States, some of which had already been addressed in Agenda 21, including small size and geographic isolation that prevent economies of scale. In addition, the Barbados Programme of Action underlined the excessive dependence of small island developing States on international trade; high population density, which increases the pressure on already limited resources; the overuse of resources and premature depletion; relatively small watersheds and threatened supplies of fresh water; costly public administration and infrastructure; and limited institutional capacities and domestic markets.

238. The comprehensive structure of the Barbados Programme of Action developed principles and set out specific strategies at the national, regional and international levels over the short, medium and long terms in support of the sustainable development of small island developing States. The Barbados Programme of Action emphasized the crucial importance of oceans to small island developing States across several of its thematic areas, including climate change and sea level rise, waste management, coastal and marine resources, tourism resources, biodiversity resources, transport and communication, science and technology.

Monterrey Consensus

239. The Monterrey Consensus, adopted at the International Conference on Financing for Development in March 2002, put forward a framework for a global development partnership whereby developing countries take responsibility for their own poverty reduction and donor countries support that endeavour through increased financial aid and more open trade. The consensus is a commitment to a broad-based development agenda that takes into account poverty reduction and environmental sustainability as well as economic growth. The consensus highlighted certain groups of countries that require particular attention, including small island

developing States, reaffirming the international community's commitment to the Barbados Programme of Action.

240. The Consensus called for the reinforcement of national efforts in capacity-building in such areas as institutional infrastructure, human resource development and public finance, particularly in small island developing States and other vulnerable groups. The consensus also highlighted the importance of enhanced and predictable access to all markets for the exports of developing countries, including small island developing States, and the need for reinforced support for trade-related training, capacity and institution building and trade-supporting services, with special consideration given to small island developing States and other vulnerable groups. Finally, the Consensus recognized the fact that for many small island developing States, official development assistance was still the largest source of external financing and was critical to the achievement of the Millennium Development Goals and other internationally agreed development targets.

Mauritius Strategy

241. In 2005, at a review meeting held in Port Louis, Mauritius, the Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of small island developing States was adopted at the Mauritius International Meeting with a view to addressing the implementation gap that still confronted small island developing States. Participants at the meeting recognized that there were still constraints in fulfilling the activities of the Barbados Programme of Action. In particular, small island developing States had pursued the implementation of the Plan within the constraints posed by limited financial resources, including an overall decline in official development assistance.

242. The Mauritius Strategy set forth actions and strategies in 19 priority areas that build on the original 14 thematic areas of the Barbados Programme of Action. New additional thematic areas in the Mauritius Strategy included graduation from least developed country status, trade, sustainable production and consumption (as called for by the Johannesburg Plan of Implementation), health, knowledge management, and culture — all of which are intended to support small island developing States in achieving internationally agreed targets and goals, such as the Millennium Development Goals. In line with the Goals, the framework of the Strategy put in place measures to build resilience in small island developing States.

243. During the sixty-fifth session of the General Assembly, held in 2010, Member States conducted a high-level five-year review of the Mauritius Strategy (A/65/115) to assess progress made, lessons learned and constraints encountered in addressing the vulnerabilities of small island developing States. Within the context of that review, the continuing and emerging issues for small island developing States in relation to oceans and seas were highlighted, along with progress achieved and remaining implementation gaps.

244. The most recent General Assembly resolution on follow-up to and implementation of the Mauritius Strategy (65/156) specifically acknowledged "the particular relationship of small island developing States with the oceans and the need for sustainable development and management of their ocean and marine resources".

245. General Assembly resolution 65/2 acknowledges that small island developing States "have demonstrated their commitment to promoting sustainable development", including in establishing coastal and marine protected areas, but that "climate change and sea-level rise continue to pose a significant risk to small island developing States and their efforts to achieve sustainable development and, for some, represent the gravest of threats to their survival and viability". It also recognizes that small island developing States "continue to be heavily dependent on their coastal and marine resources" and face development challenges including "global overfishing and destructive fishing practices, and barriers to increased participation in fisheries and related activities". It reiterates the continuing need for "improved conservation of coastal and marine resources and integrated coastal management" and urges the international community to continue and enhance its support for small island developing States to "strengthen their implementation of integrated coastal zone management strategies and their scientific research capacity". To that end, small island developing States and the "relevant regional and international development partners should work together to develop and implement regional initiatives".

246. By its paragraph 18, resolution 65/2 also reiterates the "need for the adoption and implementation of effective measures at the international, regional and national levels that provide for the long-term sustainable use of fisheries resources, given their vital importance to the sustainable development of small island developing States". In that regard, the international community reaffirmed the commitment to urgently reduce the capacity of the world's fishing fleets to levels commensurate with the sustainability of fish stocks; to promote the full participation of small island developing States in regional fisheries management organizations; to assist small island developing States in developing their fisheries sector, including through capacity-building, so as to facilitate a greater level of participation in high seas fisheries; to further strengthen the capacities of small island developing States to carry out monitoring and implement enforcement measures to combat illegal, unreported and unregulated fishing, and overfishing; and to urge the mainstreaming of efforts to assist small island developing States with other relevant international development strategies, with a view to enhancing international coordination.

247. The protection of oceans from waste was highlighted in paragraph 21 of resolution 65/2, which called upon the international community "to further assist small island developing States in the development of appropriate systems for recycling, waste minimization and treatment, reuse and management, and mechanisms to protect the oceans and coastal areas from waste and toxic materials, including through the creation and strengthening of systems and networks for the dissemination of information on appropriate environmentally sound technologies, recycling and disposal technologies".

2. Activities

Sustainable fisheries management

248. Livelihoods, food security, culture, leisure, government revenue and employment in small island developing States depend to varying degrees on fish stocks. For example, tuna fisheries constitute by far the most valuable fishing activity in the Pacific region, contributing more than 10 per cent of GDP and over 50 per cent of exports in some Pacific small island developing States (A/65/115).

249. Fisheries management issues have become more challenging for small island developing States as they struggle to cope with their commitments to international fisheries agreements and international programmes of action. Capacity constraints, including both insufficient and inappropriate capacity, have significant negative effects on the sustainability of fisheries.

250. The five-year review of the Mauritius Strategy found that some progress had been made in sustainable fisheries management. Small island developing States have established national vessel monitoring systems, introduced national plans and policies and are developing aquaculture to promote food security. At the regional level, the Western and Central Pacific Ocean Fisheries Commission meeting of 2008 adopted measures that included a cut of 10 per cent in long-line fishing in 2009; periods of closure of the high seas and exclusive economic zones to fishing using Fish Aggregating Devices; and future 100 per cent coverage of purse seine fishing vessels with observers.

251. Continuing challenges in fisheries management include developing ecosystem-based sustainable coastal fisheries, strengthening national tuna industries (Pacific, Atlantic and Indian Oceans, Mediterranean and South China Seas), improving surveillance of territorial waters, introducing rights-based fisheries management systems (Pacific) and improving compliance with sanitary measures for fish handling (Pacific). The continuing proliferation of illegal, unreported and unregulated fishing across the Pacific is of particular concern and will require stronger conservation and management measures to adequately protect current tuna stocks from overexploitation.

Climate change

252. Small island developing States are especially vulnerable to climate change due to their small size, narrow resource base, high susceptibility to natural hazards, low economic resilience, and limited human and technological capacity for mitigating and adapting to the effects of climate change (see also paras. 311-312). Certain small low-lying islands are facing the increasing threat of the loss of their entire national territories. Others are also experiencing the effects of increasing frequency of cyclones, storms and hurricanes associated with climate change, causing major set-backs to their socio-economic development. The economic downturn includes loss of agricultural land and infrastructure, and negative impacts on fisheries and tourism. Environmental effects include loss of biodiversity, saltwater intrusion and the degradation of terrestrial and wetland habitats. Social effects include the destruction of human settlements, the loss of livelihoods and negative effects on health and access to freshwater. The very existence of low-lying atoll nations, such as Kiribati, Maldives, the Marshall Islands and Tuvalu, is threatened by climate change-induced sea-level rise (A/65/115).

253. Small island developing States, like other countries, face serious problems in terms of reducing carbon dioxide emissions, an issue that is high on the political agenda. In 2006, emissions ranged from as low as 0.16 metric tons per capita in Timor-Leste to as high as 25 metric tons per capita in Trinidad and Tobago. From 1990 to 2005, carbon dioxide intensity increased in 15 of the 29 small island developing States for which data was available.[201]

[201] See www.un.org/esa/dsd/resources/res_pdfs/publications/trends/trends_sids/Trends_in_Sustainable_Development_SIDS.pdf.

254. While small island developing States have made efforts to carry out climate change adaptation projects, progress thus far has typically focused on public awareness, research and policy development rather than on implementation. Under the GEF Least Developed Countries Fund, national adaptation programmes of action were developed for several small island developing States on the list of the least developed countries, including Kiribati, Samoa, Sao Tome and Principe, Tuvalu and Vanuatu. Multisectoral adaptation studies were also carried out in Mauritius and Saint Lucia, and projects in Fiji, Kiribati, Tonga and Vanuatu showcased cost-effective adaptation measures, supported by the South Pacific Regional Environment Programme and GTZ (German agency for technical cooperation). The International Climate Change Adaptation Initiative and the CARICOM Climate Change Centre have provided assistance in capacity-building. Support from the international community to help implement the adaptation measures proposed in the national adaptation programmes of action remained limited, and small island developing States with higher incomes have found it particularly difficult to tap into international funds to co-finance adaptation measures.

255. The wide range of impacts associated with climate change pose a challenge in terms of policy and planning. Legislative changes were made in Kiribati, but the majority of small island developing States have not passed legislation specific to climate change. Issues related to climate change and sea level were integrated in the national sustainable development strategy of Tuvalu and in the policy framework of Bahrain. Research in support of policy and decision-making has been promoted in Mauritius. The lack of data and understanding of climate change issues continues to constrain progress, especially in terms of local adaptation measures in rural and outer islands.

256. It is clear that small island developing States will need climate change policies that cover all economic sectors and guide responses to disasters and equity issues and that address more extreme options, such as possible relocation from islands. Good practices in the area of adaptation need to be shared effectively and a large funding gap for adaptation projects is apparent in small island developing States. Financial support from development partners will be required on a much larger scale (A/65/115).

Waste management

257. Small island developing States are vulnerable to waste management challenges in terms of both land- and sea-based sources of pollution, particularly in view of their low environmental and socio-economic carrying capacities. Current waste management practices have resulted in the degradation of coral reefs, seagrass beds, mangroves and coastal zones, as well as in health warnings about disease and contaminated food supplies. Such developments threaten tourism, fisheries and even food security.

258. Waste management systems in small island developing States have come under pressure owing to increasing population, urbanization, changing consumption patterns, trade and seasonal tourism. The volume of domestic wastewater and solid waste has increased rapidly, as has the share of non-degradable and toxic materials. Municipal solid waste volumes are estimated to have doubled in the Pacific small island developing States in recent years. In contrast to developed countries, more

than one half of the waste in small island developing States is organic, which underlines the importance of composting and other alternatives to incineration.

259. Significant progress can be reported from many small island developing States in terms of improving waste management. Waste collection coverage in major cities in the Caribbean reached between 60 and 90 per cent of the population, with the exception of Haiti, where the rate was much lower. Some progress has been made with regard to sanitary landfills. Many small island developing States have already achieved the Millennium Development Goal target related to universal access to improved sanitation. According to the World Bank, almost all Caribbean small island developing States had achieved at least 80 per cent access to sanitation, with most having surpassed 90 per cent. However, high incidences of eutrophication due to the dumping of sewage into rivers and coastal waters are also reported. While the high costs of modern sewage treatment plants are a constraint, cheaper biological treatment methods that are especially suited to tropical climates do exist. Jamaica, Maldives, Mauritius, Saint Lucia, Seychelles and Saint Vincent and the Grenadines have developed national solid waste management policies, acts or programmes. Seychelles has made advances in systematic composting and waste recycling. Waste recycling on a commercial scale exists in Mauritius, where plastics are recycled and bagasse is being used as a source of energy.[202]

260. The special characteristics of small island developing States also limit the transferability of good practices from other developing countries. The economic viability of recycling efforts is constrained by the relatively small quantities of waste and the high energy and transport costs. Where land is scarce, incineration is often chosen, an option that has turned out to be unsustainable in terms of pollution and high costs.

261. Small island developing States are increasingly vulnerable to the transboundary movement of hazardous wastes and chemicals originating from land-based and shipborne sources. In particular, the large amounts of plastics in the oceans and ship waste are matters of concern and have had destructive impacts on the marine ecosystems of small island developing States. The Basel Convention is aimed at addressing the threats posed by the transboundary movement of hazardous wastes, including their disposal in those States.

Water and sanitation services

262. Due to their small size and geological, topographical and climatic conditions, small island developing States face major constraints in terms of the quantity and quality of freshwater resources. That is particularly the case for low-lying coral-based islands, where groundwater supplies are limited and are protected only by a thin permeable soil. Even where rainfall is abundant, access to clean water has been restricted by the lack of adequate storage facilities and effective delivery systems. Long-term threats to water quality include rapid population growth in urban areas, contamination of freshwater sources by human and livestock waste, industry-related pollution and, in some cases, pesticides and other agricultural chemicals.

263. In the Pacific, from 2006 to 2009, there were a number of significant initiatives in the region's water and sanitation sector, largely guided by the Pacific

[202] Republic of Mauritius, "Mauritius Strategy for Implementation National Assessment Report 2010".

Plan, into which water, sanitation and hygiene challenges were incorporated in 2006. The Pacific Hydrological Cycle Observing System was established in 2007 to assist Pacific small island developing States in addressing the lack of capacity and related infrastructure for hydro-meteorological data collection and storage.[203]

264. Pacific small island developing States primarily dependent on surface water (the Cook Islands, Federated States of Micronesia, Fiji, Palau, Papua New Guinea, Samoa, Solomon Islands and Vanuatu) have progressed with the installation of rain gauges and water resources assessments of major rivers. Support for groundwater-dependent countries (Kiribati, Marshall Islands, Nauru, Niue, Tonga and Tuvalu) has focused on the consolidation of monitoring procedures and developing consistent and reliable data sets. For rainwater harvesting-dependent countries (Nauru and Tuvalu), geographic information system databases have been developed to optimize rainwater harvesting capture and storage.

265. In the Caribbean region, most countries have relatively high levels of access to drinking water and sanitation. The period 2006 to 2009 saw increased awareness of climate change-induced drought conditions that may prevail in the southern Caribbean and of the need for water conservation. Wastewater management and sewage needs assessment projects have been supported through UNEP, the Integrating Watershed and Coastal Area Management Project and the Caribbean Environment Programme.[204]

Sustainable tourism

266. Many small island developing States depend on the tourism sector as a key contributor to development and economic growth. However, the development of the tourism sector also presents environmental and cultural challenges.

267. The promotion of ecotourism, cruises, events and diving has been on the agenda of many small island developing States, but concrete development in those areas has generally been limited. Pacific small island developing States developed a regional cruise strategy in 2008, and those in the Caribbean are exploring similar options. Ecotourism is being promoted in various forms in Cuba, Fiji, Sao Tome and Principe, Seychelles and Tuvalu, among others.

268. In the past five years, there have been many important advances in terms of regional institutions, especially in the Caribbean and the Pacific. For example, the Pacific Plan adopted by the Pacific Island Forum translates the Mauritius Strategy into a regional framework that has effectively guided national and regional policy and institutional developments. The region is also closely connected with international support networks through the United Nations regional commission, agencies and funds.

269. In the Caribbean, the Regional Coordinating Mechanism allows countries to achieve effective coordination of the various sustainable development initiatives, while providing assistance and support at the national level. The operationalization of the Mechanism as the main instrument for the implementation of the Mauritius Strategy was carried out in close partnership between the Economic Commission for

[203] ESCAP, *Sustainable development in the Pacific: progress and challenges* (2010).
[204] ECLAC document LC/CAR/L.258.

Latin America and the Caribbean, UNEP, the CARICOM secretariat, the Association of Caribbean States and the Organization of Eastern Caribbean States secretariat.

270. Availability and access to good quality data for decision-making is an important issue for small island developing States. However, global data systems (see also para. 221) are available for spatial and real time data, including satellite and air photo imagery and remotely sensed data used in early warning tools for climate variability and natural hazards. Examples of initiatives include the South Pacific Applied Geoscience Commission GeoNetwork, the Caribbean Marine Protected Area Management Network and the Pacific Regional Information System.

IV. Gaps, challenges and emerging issues

A. Gaps

271. The sustainable use of oceans and seas cannot be achieved without addressing a wide range of factors, including new and emerging issues. In particular, the continued degradation of the marine environment makes it more difficult to achieve the goals established at major summits on sustainable development, such as adoption of an ecosystem approach to natural resources management and integrated coastal and ocean management. The pressing need to gain access to ocean resources and to exploit them in a sustainable manner has spurred the international community into re-examining ocean governance issues,[205] including from the perspective of cooperation and coordination.[206] States have also identified the difficulties linked to the implementation, monitoring, compliance and enforcement of the Convention and existing binding and non-binding international instruments. The General Assembly has consistently brought to the attention of all stakeholders the need to improve cooperation and coordination at the national, regional and global levels, in accordance with the Convention, to support States in implementing integrated management and the sustainable development of oceans and seas (resolution 65/37).

1. Gaps in implementation of the legal and institutional framework for the sustainable development of oceans and seas

272. The Convention, which is of strategic importance as the basis for national, regional and global action and cooperation in the marine sector, is now supplemented by two implementing Agreements. In addition, there are a number of specialized instruments, some of which are described in the present report, that provide the legal and institutional framework for oceans and seas. They relate, inter alia, to biodiversity (see sect. III-C, 1) living marine resources (see sect. III-C, 2), shipping (see paras. 168-172), marine scientific research (see sect. III-C, 5); protection and preservation of the marine environment and protection of specific areas and species (see sect. III-C, 3).

273. It is noted however, that while States have highlighted in particular the importance of increased cooperation and coordination, including cross-sectoral and

[205] A/65/68, paras. 46-48.

[206] See discussions during the 2006 and 2010 Review Conference on the 1995 Fish Stocks Agreement (A/CONF.210/2006/15 and A/CONF.210/2010/7) and at meetings of the Working Group on biodiversity beyond areas of national jurisdiction (A/61/65, A/63/79 and A/65/68).

capacity-building,[207] the full comprehension at the national level of that framework remains elusive. Limited educational, training and technical capacity and financial resources are recurrent challenges to effective implementation of international instruments (A/CONF.216/PC/8), including the Convention.

274. A number of specific issues have been identified as requiring heightened attention to strengthen the sustainable development of oceans and seas. They include flag State implementation and port State enforcement,[208] the conservation and sustainable use of marine biodiversity beyond areas of national jurisdiction,[209] including marine genetic resources[210] and illegal, unregulated and unreported fishing (see also sect. IV).

2. Knowledge or scientific gaps

275. Scientific knowledge plays an essential role as a basis for sound decision-making and in that regard the need to bridge the gap between policy demands and scientific research has been underlined.[211] Identifying gaps in knowledge is also important to determine research priorities. The approach to understanding the oceans needs to be integrated, interdisciplinary and intersectoral.[212] Cooperative approaches among international organizations involved in marine issues could be beneficial in that regard.[213]

276. Within the context of discussions at the General Assembly Working Group (see paras. 57-59), delegations have identified a number of areas where more studies were needed.[214] For example, it was noted that the information on vulnerable habitats and ecosystems was often incomplete and that significant gaps existed in the understanding of ocean processes. That called for regular monitoring of ocean natural systems to establish a baseline upon which to compare changes and trends, and to provide science-based information to decision makers. In that regard, predictive modelling could overcome some knowledge gaps.[215] Emphasis has been given (A/65/69/Add.2) to the need to strengthen long-term observations and monitoring of the state of the marine environment with the establishment of the Regular Process (see paras. 60-65 above). The need to enhance knowledge to address climate change adaptation and mitigation by, inter alia, identifying current scientific and policy gaps in order to promote sustainable management, conservation and enhancement of natural carbon sequestration services of marine and coastal biodiversity was also expressed. Furthermore, with the view to improving the sustainable management of coastal and marine areas and to increasing the resilience of coastal and marine ecosystems, the identification of underlying drivers of marine and coastal ecosystems loss and destruction would need to be addressed.

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[207] These two issues are central to discussions at the Informal Consultative Process, the Ad Hoc Working Group on biodiversity, fisheries meetings and the Regular Process (see relevant reports of meetings).

[208] See resolutions 58/240 and 65/37; and A/65/68, paras. 42-45.

[209] A/65/68, paras. 44 and 45.

[210] A/61/65, A/63/79 and A/65/68.

[211] A/63/79, para. 5.

[212] A/56/121, paras. 31 and 32.

[213] A/65/68, para. 34.

[214] Ibid., para. 80 and A/61/65, annex II.

[215] A/65/68, para. 32.

277. Developing States including least developed States, African coastal States and small island developing States, also emphasized the need for marine science and transfer of technology to fill knowledge gaps.[216]

B. Challenges

1. Maritime delimitation

278. Clearly delineated maritime boundaries identify the areas from which coastal States, by virtue of their sovereignty or sovereign rights and jurisdiction, derive benefits through the exploitation of their marine living and non-living resources. In addition, maritime boundaries are central to the protection of the marine environment and the sustainable use of marine resources, as they make it possible to determine which coastal State has responsibilities in that regard. Thus, maritime boundaries are one of the key factors for sustainable development.

279. The establishment of maritime boundaries defines the extent of maritime areas beyond national jurisdiction, which are also important for achieving sustainable development.

280. The delineation of the outer limits of the continental shelf, including beyond 200 nautical miles from the baselines, would bring certainty in the exercise of rights and jurisdiction in national and international areas. In that context, the work of the Commission on the Limits of the Continental Shelf is of importance.

281. The technical complexity of the delineation of the outer limits of the continental shelf presents a challenge for many developing States that do not have the financial resources or the expertise to carry out the required surveys and other scientific work. Several States, including a number of developing States have made a submission to the Commission and many others, have provided preliminary information indicative of the date they intend to make a submission.

282. Where maritime boundary delimitation by agreement is delayed as a result of historic factors or legal and political difficulties, articles 74 and 83 of the Convention stipulate that "if no agreement can be reached within a reasonable period of time, the States concerned shall resort to the procedures provided for in Part XV (of the Convention). Pending agreement [...], the States concerned, in a spirit of understanding and cooperation, shall make every effort to enter into provisional arrangements of a practical nature and, during that transitional period, not to jeopardize or hamper the reaching of the final agreement".

283. The need to acquire complex scientific and technical knowledge for the delineation of the outer limits of maritime zones, in particular the extended continental shelf, and the political and historic intricacies of maritime boundary delimitation often prove to be considerably challenging, especially for developing countries. Capacity-building and mechanisms, both bilateral and regional, facilitating boundary negotiations should be encouraged to address these challenges.

[216] This issue has permeated for example discussions on all topics of the Informal Consultative Process; see A/64/66, para. 48.

2. Implementation and enforcement

284. The need to enhance effective implementation and enforcement of the international legal and policy instruments relating to oceans and the seas continues to be a challenge for the international community. Although lack of capacity and technical knowledge contribute to that issue, insufficient political will and lack of long-term, integrated planning also play a role.

285. Those issues have been raised in numerous forums, including in the programme areas in Agenda 21 and in the Johannesburg Plan of Implementation.[217] Although flag States have primary responsibility for ensuring the effective implementation and enforcement of such instruments, coastal States and port States have had an increasingly important role due to the failure of some flag States to exercise effective control over vessels flying their flag.[218] In that regard, lack of effective control by flag States can pose a threat to the safety of navigation and the marine environment and can lead to the overexploitation of living marine resources.

286. Issues relating to implementation and enforcement have been principally addressed by the General Assembly in the context of its annual resolutions on oceans and the law of the sea and sustainable fisheries. In that regard, the General Assembly, by its resolutions 65/37 and 65/38, has emphasized the importance of State participation in existing instruments and increased efforts in the effective implementation of such instruments, including through effective flag State control, port State control, market-related measures and monitoring, control and surveillance, as well as modern approaches such as the precautionary and ecosystem approaches. It has also reiterated the essential need for cooperation, including through capacity-building and the transfer of marine technology, to ensure that all States are able to implement the Convention and benefit from the sustainable development of the oceans and seas, and participate fully in global and regional forums and processes dealing with oceans and law of the sea issues.

287. These issues have also been addressed by the Informal Consultative Process,[219] and by the Working Group.[220] The Secretary-General has also provided regular reports to the General Assembly on issues relating to implementation and enforcement.[221] In addressing those issues, particular attention has been given to the need to examine and clarify the role of the "genuine link" in relation to the duty of flag States to exercise effective control over vessels flying their flag.[222] In 2003, the Secretary-General formed an inter-agency task force in response to calls for an investigation into the causes of the failure of some vessels to conform to international requirements regarding ship safety, labour conditions, fisheries conservation and protection of the marine environment.[223] IMO also convened an ad

[217] See, for example, Agenda 21, chap. 17, paras. 17.30, 17.45, 17.46, 17.50, 17.55, 17.79, 17.80 and 17.83; the Johannesburg Plan of Implementation (see note 9 above), chap. IV, paras. 30-34 and 44.

[218] See A/58/65, paras. 85-93, A/59/62, paras. 150-155 and A/63/63, paras. 212-216.

[219] See reports of these meetings at www://un.org/Depts/los/consultative_process/consultative_process.htm.

[220] See, for example, resolution 65/68, paras. 11-12 and 42-45; A/64/66/Add.2, paras. 212-217.

[221] See, for example, A/58/65, paras. 85-93 and A/59/62, paras. 150-155.

[222] See resolution 58/240, para. 28, resolution 58/14, para. 22, resolution 59/24, para. 41 and resolution 59/25, para. 30. Also see A/59/122, para. 10.

[223] See A/59/63, A/59/63/Corr.1 and A/AC.259/11.

hoc consultative meeting of senior representatives of international organizations in 2005 on the subject of the "genuine link" (A/61/160).

288. In order to improve implementation and enforcement by flag States, IMO, by its resolutions A.946(23) and A.973(24), approved the Voluntary IMO Member State Audit Scheme to provide a comprehensive and objective assessment of how effectively flag States administer and implement the mandatory IMO instruments covered by the Audit Scheme. In 2009, the IMO Assembly also endorsed the decision of the IMO Council and agreed to make the Audit Scheme an institutionalized, mandatory scheme that will be phased in through the introduction of amendments to IMO instruments in 2013, for entry into force in January 2015.[224] The shipping industry has also developed guidelines on flag State performance in order to encourage ship operators to examine the performance of a flag State and to put pressure on States to effect improvements that may be necessary, especially in relation to safety of life at sea, the protection of the marine environment and the provision of acceptable working and living conditions for seafarers.[225]

289. In regard to port State measures, a number of States continue to coordinate their activities to ensure safety and security of international shipping in the context of regional port State control organizations, including through joint concentrated inspection campaigns to ensure compliance with international safety, security and environmental standards, including the provision of adequate living and working conditions.[226] However, there is a general need for harmonization of procedures, interchange of information and coordination among the various regimes, taking into consideration regional differences, while working towards the achievement of a standardized procedure.[227]

290. In the context of fisheries, the General Assembly has continued to urge enhanced action to eliminate illegal, unregulated and unreported fishing by vessels flying "flags of convenience", to require that a "genuine link" be established between States and fishing vessels flying their flags and to clarify the role of the "genuine link" in relation to the duty of States to exercise effective control over such vessels.[228] It has also recently urged States operating open registry to effectively control all fishing vessels flying their flag, as required by international law, or otherwise stop open registry for fishing vessels.[229]

291. In that regard, FAO has been working to develop a global record of fishing vessels, refrigerated transport vessels and supply vessels, which is envisaged as a global repository designed to provide reliable identification of vessels authorized to engage in fishing or fishing-related activity.[230] A technical consultation will also be convened by FAO in May 2011 to develop guidelines on flag State performance.[231]

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[224] See A/65/69/Add.2, paras. 73 and 74.

[225] See A/59/62, paras. 150-155. The guidelines are available from www.marisec.org/flag-performance.pdf.

[226] There are currently nine regional port State control agreements in existence (see IMO website for details: www.imo.org/home.asp).

[227] See A/63/63, paras. 196-197.

[228] See, for example, resolution 64/72, para. 53.

[229] Resolution 65/38, para. 48.

[230] FAO, *The State of World Fisheries and Aquaculture* (Rome, 2010). See also FAO report FIRO/R956.

[231] See, ftp://ftp.fao.org/FI/DOCUMENT/tc-fsp/2011/default.htm.

292. The efforts by the international community will assist in addressing gaps in the existing legal and policy framework and improve oceans governance, generally. There is a need, however, for enhanced cooperation and coordination in regard to implementation and enforcement, including through active participation in regional bodies, exchange of information, joint programmes and improved capacity-building and transfer of technology.

3. Capacity-building

293. Capacity-building has a cross-cutting character and relevance to oceans and law of the sea issues that have been widely recognized,[232] particularly as several needs of States are relevant to more than one area or sector of oceans and the law of the sea.[233] The General Assembly, by its resolution 65/37, has highlighted the need to ensure, through capacity-building, that least developed countries and small island developing States as well as coastal African States are able to implement the Convention and to benefit from the sustainable development of the oceans and seas. At the eleventh meeting of the Informal Consultative Process, many delegations highlighted that capacity-building should aim at developing capacities for effective participation in economic activities, in particular in sustainable fisheries, and should not be limited to the implementation of international commitments.[234]

294. The framers of the Convention were keenly aware of the need for capacity-building, especially in the absence of any fund or assistance programme embedded in the Convention. For example, the Convention, in Part XIV on development and transfer of marine technology, requires States to promote the development of the marine scientific and technological capacity of developing States with regard to the exploration, exploitation, conservation and management of marine resources, the protection of the marine environment, marine scientific research, and other activities in the marine environment compatible with the Convention in order to accelerate the social and economic development of developing States.

295. Chapter 17 of Agenda 21 sets out for each of the seven programme areas 12 specific suggestions about capacity-building, financing and cost evaluation, scientific and technological means and human resource development. In his report of 9 March 2001 (A/56/58), the Secretary-General provided detailed considerations on capacity-building under each of the programme areas in Chapter 17 of Agenda 21. Chapter 34 of Agenda 21 is dedicated to the transfer of environmentally sound technology, cooperation and capacity-building. It also highlights the support of endogenous capacity-building and the promotion of long-term technological partnerships between holders of environmentally sound technologies and potential users.

296. Chapter 37 of Agenda 21 is dedicated entirely to capacity-building and the World Summit reconfirmed the priority of building capacity to assist developing countries to obtain their sustainable development goals.[235] The need for capacity-building especially for small island developing States is notably included in the Barbados Plan of Action and the ensuing Mauritius Strategy. The special needs of

[232] A/64/66, para. 155.

[233] A/65/69, paras. 33-94.

[234] A/65/164, para. 12.

[235] See Global Environment Facility, "Strategic approach to enhance capacity-building" (2003), available from www.gefweb.org.

Africa were highlighted in the United Nations Millennium Declaration. More recent relevant outcomes include the 2008 Doha Declaration on Financing for Development and the Accra Agenda for Action.

297. At the sectoral level, a number of capacity-building activities and initiatives are being carried out at the international, regional and national levels (A/65/69). For example, with regard to early warning systems (see also paras. 219-220), IOC organizes installations and upgrades of sea level stations in numerous countries in the Indian and Pacific Oceans and Caribbean and Mediterranean Seas, and provides a data portal on sea level station monitoring.[236] Numerous capacity development initiatives have been undertaken in relation to the Global Ocean Observing System and Global Sea Level Observing System, including sea level observations and analysis and technical visits. Through an agreement with the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, IOC provides Member States real-time access to the organization's seismic stations for tsunami warning purposes.[237]

298. No comprehensive assessment has been carried out at the global level of the capacity-building needs of States in relation to ocean affairs and the law of the sea.[238] In previous reports, the Secretary-General has provided information on needs related to marine science and technology.[239] In its report of 23 July 2010 (A/65/164), the General Assembly also highlighted ongoing capacity-building needs of States, inter alia, for cross-sectoral and multi-level coordination, data accessibility, infrastructure, technology and equipment, ocean mapping, maritime delimitation and delineation, human resource development, financial resource needs, capacity for enforcement and needs in regard to other sustainable use of the oceans. Furthermore, all meetings of the Informal Consultative Process have discussed the need for capacity-building and identified capacity gaps in relation to marine scientific research; transfer of environmentally sound technologies associated with the conservation and sustainable development and use of marine resources including marine genetic resources; sustainable fisheries; development and improvement of hydrographic services including transition to electronic nautical charts; and the enhancement of technologies and capacities to respond to threats to maritime security and safety.

299. During discussions on the issue of capacity-building at the Informal Consultative Process, a number of challenges in implementing capacity-building activities and initiatives have been identified.[240] For example, it has been highlighted that needs assessments are critical to priority-setting and are essential to design capacity-building programmes that reflect specific conditions and priorities of beneficiary countries, and that capacity-building needs to encompass financial, human resource, institutional and scientific capacity and be sustainable.

300. Opportunities for ways forward were also identified, including encouraging capacity-building through the creation and strengthening of national and regional

[236] Available from www.ioc-sealevelmonitoring.org.

[237] See www.ctbto.org/press-centre/press-releases/2010/unesco-and-ctbto-sign-agreementto-enhance-disaster-mitigation-effortsand-capacity-building-in-developingcountries/?Fsize=vpogxnflwhj.

[238] A/65/69, para. 33.

[239] A/45/563, A/45/712, A/46/722 and A/56/58.

[240] See A/65/164 and A/65/69, para. 56.

centres for technological and scientific research, as provided for in the Convention, and focusing on strengthening South-South cooperation as an innovative way to build capacity and cooperative mechanisms.

301. In his report of 22 December 2010 (A/CONF.216/PC/7), the Secretary-General observed that strengthened international cooperation would be crucial to addressing ongoing and emerging sustainable development challenges which would include knowledge sharing, institutional capacity-building, technology sharing and innovative financing for a green economy transition.

4. Integrated management of oceans and seas

302. In recent years, there has been increasing international recognition of the need to manage human activities that have an effect on the marine environment and its ecosystems in an integrated, cross-sectoral manner in order to promote the sustainable development of oceans and seas and their resources.

303. Agenda 21, in its paragraph 17.1, recognized that the integrated nature of the marine environment required approaches to marine and coastal area management and development, at the national, regional and global levels, that were integrated in content and precautionary and anticipatory in ambit. It also provided, in its paragraphs 17.3 to 17.17, that coastal States should establish integrated ocean management to ensure the sustainable utilization of marine resources and the rational development of marine industries. By paragraph 30 (e) of the Johannesburg Plan of Implementation, States committed to promoting integrated, multidisciplinary and multisectoral coastal and ocean management at the national level and the provision of assistance to coastal States in developing policies and mechanisms to that end. By paragraphs 30 (d) and 32 (c) of the same, States also committed to encouraging the application of an ecosystem approach by 2010, and developing and facilitating the use of diverse approaches and tools, including the ecosystem approach and the integration of marine and coastal areas management into key sectors to promote the conservation and management of the oceans.

304. The Informal Consultative Process has considered integrated ocean management and ecosystem approaches at its fourth and seventh meetings, respectively.[241] The General Assembly has subsequently addressed those issues in its annual resolution on oceans and the law of the sea. In particular, the Assembly has emphasized the importance of regional organizations and arrangements for cooperation and coordination in integrated ocean management, including where separate regional structures address different aspects of oceans management.[242] The General Assembly has consistently invited States to consider the agreed consensual elements on ecosystem approaches stemming from the Informal Consultative Process.[243] The General Assembly has also endorsed the recommendations of the Working Group related to cooperation and coordination for integrated ocean management and ecosystem approaches in relation to marine biodiversity beyond areas of national jurisdiction.[244]

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[241] See A/58/95 and A/61/156.

[242] See resolutions 57/141, 59/24, 60/30, 61/222, 62/215, 63/111, 64/71 and 65/37.

[243] See resolutions 61/222, para. 119; 62/215, para. 99; 63/111, para. 117; 64/71, para. 134; and 65/37, para. 153.

[244] Resolution 65/37, para 162. See also A/65/68, para. 13.

305. In its annual resolutions on sustainable fisheries, the General Assembly has also encouraged States to apply by 2010 an ecosystem approach and, inter alia, urged regional fisheries management organizations and arrangements to incorporate ecosystem approaches into their measures.[245]

306. Integrated management and ecosystem approaches have been considered and promoted by a number of other international forums and organizations, including the Convention on Biological Diversity, FAO, UNEP, UNDP and GEF. At the regional and subregional levels, work has been on-going in the context of the regional seas organizations, regional fisheries management organizations and arrangements and the Large Marine Ecosystems to implement integrated management and ecosystem approaches. The annual reports of the Secretary-General provide information on relevant developments in those forums.

307. While some progress has been achieved, the development and implementation of integrated ocean management and ecosystem approaches still present chalienges, in particular beyond areas of national jurisdiction.[246]

308. Current sectoral mandates and approaches to addressing the impacts of human activities on the marine environment present difficulties in applying a multisectoral and multidimensional approach to the effective protection of the marine environment and the sustainable use of its resources. Other impediments include limited capacity and conflicting priorities and policies.[247] The need for capacity-building for developing States has been particularly underlined, especially with regard to marine scientific research and transfer of technology.[248]

309. Improved cross-sectoral cooperation and coordination would be beneficial, in particular with a view to assessing and addressing the cumulative effects of human activities on the marine environment[249] and capacity-building needs for an integrated management of the oceans and seas.

5. Environmental vulnerability of small island developing States

310. Small island developing States are highly vulnerable to global environmental threats due to their small size, highly fragmented nature, remoteness, low-lying topography, ecological uniqueness, limited resources, and high exposure to natural hazards. According to the environmental vulnerability index developed in 1999 by the South Pacific Applied Geoscience Commission, UNEP and partners, the level of environmental vulnerability is higher or worse for 27 of the 33 small island developing States for which data is available than the average of all of the least developed countries and has increased or worsened since 2005. The index is based on 50 indicators covering natural and anthropogenic risks, resilience and ecosystem integrity. Acquired vulnerability, meaning that damage sustained in the past leads to increased vulnerability in the future, exacerbates the environmental vulnerability of small island developing States.

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[245] See resolutions 62/177, paras. 85 and 93; 63/112, paras. 89, 93 and 98; 64/72, paras. 97, 101 and 107.

[246] See A/61/156, para. 94.

[247] See A/57/57, para. 649 and A/61/156, para. 78.

[248] See A/61/156, paras. 34 and 74.

[249] Ibid., para. 30.

311. Climate change and resulting sea level rise is an existential threat to many low-lying atoll nations and a serious concern for all small island developing States, particularly due to their limited human and technological capacity for mitigating and adapting to the effects of climate change (see sect. III, D).

312. Ocean acidification and the destruction of coral reefs, critical to biodiversity and ecosystem adaptation, have severe repercussions in virtually all aspects of life in small island developing States, threatening fish stocks and food security, livelihoods and the ecological integrity of coastal zones.

313. Pollution generated by land-based activities, marine accidents, inadequate waste management and ballasting, inter alia, continues to cause severe environmental degradation in small island developing States, including coral bleaching, contamination of living marine resources and ecosystem disruption. Additionally, pollution threatens already scarce freshwater supplies and affects freshwater and coastal water quality. The transboundary movement of hazardous chemicals is of particular concern to small island developing States due to the fragility of their coastal and marine ecosystems and their lack of monitoring and enforcement capacity.

314. An emerging threat to biodiversity in small island developing States is that of invasive alien species from transboundary movements. Invasive alien species have dramatic effects on ecosystems and are a leading cause of species extinction. Islands are more prone to invasions because of the lack of natural competitors and predators that control populations in their native ecosystems.

6. Vulnerable marine ecosystems and ecologically or biologically significant areas

315. In recent years, the international community has paid increasing attention to the need to address the impacts of a number of activities on marine ecosystems and features considered to be vulnerable and/or ecologically or biologically significant.

316. Various reports of the Secretary-General on oceans and the law of the sea[250] and on fisheries issues (for example, A/59/298) have presented information on vulnerable marine ecosystems and ecologically or biologically significant areas, including beyond areas of national jurisdiction. While there may be various definitions of vulnerable marine ecosystems, vulnerability is a function of the specific physical as well as ecological characteristics of an area. In that regard, ecosystems that are not generally considered vulnerable may be considered as such in specific locations. Article 194, paragraph 5, of the Convention requires States to take measures to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life. Vulnerable marine ecosystems and ecologically or biologically significant areas include spawning and nursery grounds, cold-water corals, seamounts, various features associated with polar regions, hydrothermal vents, deep-sea trenches and submarine canyons, and oceanic ridges.[251]

317. Agenda 21, in its paragraph 17.46, stressed the need to protect and restore endangered marine species and preserve habitats and other ecologically sensitive areas. At the World Summit, States committed to maintaining the productivity and

[250] A/58/65, A/59/62 and A/60/63/Add.1.

[251] A/58/65, paras. 172-183.

biodiversity of important and vulnerable marine and coastal areas, including in areas within and beyond national jurisdiction.[252]

318. The General Assembly continues to address issues of relevance to vulnerable marine ecosystems and ecologically or biologically significant areas, as also assisted by the Informal Consultative Process and the Working Group (see paras. 122 and 123 above). Within the context of its resolutions on oceans and the law of the sea, the General Assembly reiterates, annually, its concern at the adverse impacts on the marine environment and biodiversity, in particular on vulnerable marine ecosystems, including corals (see paras. 333-339), of certain human activities. These may include overutilization of living marine resources, the use of destructive practices, physical impacts by ships, the introduction of invasive alien species and marine pollution from all sources, including from land-based sources and vessels, in particular through the illegal and accidental discharge of oil and other harmful substances, the loss or release of fishing gear and the illegal or accidental release of hazardous waste such as radioactive materials, nuclear waste and dangerous chemicals. The General Assembly also continues to reaffirm the need for States to continue their efforts to develop and facilitate the use of diverse approaches and tools for conserving and managing vulnerable marine ecosystems.[253]

319. Other international and regional organizations, bodies and initiatives are also working to address these issues.[254] For example, the Census of Marine Life, an international research initiative that has sought to further the knowledge and understanding of marine life, including on seamounts,[255] has concluded, inter alia, that the greatest impacts in the deep sea are currently from fisheries and hydrocarbon and mineral extraction, while in the future climate change is likely to have the greatest impact.[256]

320. Among the challenges to the effective protection of vulnerable marine ecosystems and ecologically or biologically significant areas is the fact that there is still limited information on the location, functioning, vulnerability and resilience of a number of underwater features, ecosystems and areas. That challenge, coupled with the current sectoral approach to managing the impacts of human activities on the marine environment, impedes the identification and protection of vulnerable ecosystems and ecologically or biologically significant areas.

321. The development of a common methodology for identifying such areas may assist progress towards the achievement of the Johannesburg Plan of Implementation 2012 target.[257] Increased cross-sectoral cooperation and coordination among the various stakeholders is necessary to effectively address the cumulative impacts of human activities on vulnerable marine ecosystems and ecologically or biologically significant areas, in particular with a view to identifying, in a coherent and concerted manner, such areas and developing associated management measures.

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[252] Johannesburg Plan of Implementation, para. 32 (a).

[253] Resolutions 59/24, para. 72; 60/30, para. 74; 61/222, para. 97; 62/215, para. 111; 63/111, para. 134; 64/71, para. 153; and 65/37, para. 177.

[254] See, for example, A/60/63/Add.1, paras. 226-304, A/62/66/Add.2 and A/64/66/Add.2.

[255] See www.coml.org/projects/projects.

[256] Census of Marine Life, "Scientific results to support the sustainable use and conservation of marine life: a summary of the census of marine life for decision makers" (2011).

[257] See A/65/68, para. 18.

7. Crimes at sea

322. International shipping accounts for more than 90 per cent of global trade and is therefore a crucial underpinning of sustainable development.[258] The rule of law on the oceans is essential to guarantee safe and secure oceans and facilitate sustainable development. An effective rule of law framework strengthens development because it underpins and enables security, social stability, sustainable development and economic growth, thereby creating and boosting confidence for investment and trade.

323. Crimes at sea may threaten the interests of States, particularly coastal States as well as collective security. They often have an impact on the safety and security of maritime navigation, including the potential to cause significant disruptions to commerce and navigation, financial losses to shipowners, increased insurance premiums and security costs, increased costs to consumers and producers. Additionally, they may adversely impact the marine environment and energy security.[259] Such crimes also pose a threat to the welfare and recruitment of seafarers as they may result in the loss of life, physical harm or hostage-taking of seafarers.[260] In some instances, the lives and livelihoods of fishers may also be affected.[261]

324. Crimes at sea are often transnational in nature, and may include illicit traffic in narcotic drugs and psychotropic substances, the smuggling of migrants and trafficking in persons by sea, illicit trafficking in arms and weapons of mass destruction, piracy and armed robbery at sea, smuggling and terrorist acts against shipping, offshore installations and other maritime interests as well as the intentional/wilful destruction of fibre optic submarine cables. They may also include intentional and unlawful damage to the marine environment, including from illegal dumping and the discharge of pollutants from vessels, and illegal, unregulated and unreported fishing.[262]

325. There are a number of international and regional instruments that address crimes at sea. Capacity-building activities to assist States with their efforts to combat various crimes at sea are also being undertaken by, inter alia, the Counter-Terrorism Committee Executive Directorate, FAO, IMO and the United Nations Office on Drugs and Crime. The African Union, the Council of Europe and the European Union, among others, are involved in capacity-building including through the convening of seminars and workshops, and the enhancement of the judicial capacity of a number of States.[263] Bilateral initiatives to develop human and infrastructural capacity have also been undertaken.[264]

326. However, further action is still needed. That includes enhancing the effectiveness of the international legal framework and States have been called upon to, inter alia, take appropriate measures to ensure the effective implementation of agreements to which they are party. It also includes strengthening the

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[258] See www.marisec.org/shippingfacts/worldtrade/ and www.imo.org/OurWork/HumanElement/Pages/Default.aspx.

[259] Resolution 65/37, preamble.

[260] See A/63/63, para. 54.

[261] See A/65/69/Add.2, para. 87.

[262] See resolution 65/37, preamble and para. 82 and A/63/63, paras. 39 to 160.

[263] See A/65/69/Add.2, paras. 95-101; A/64/66/Add.1, paras. 108-110 and 129.

[264] See A/63/63, para. 135.

implementation of maritime security measures; strengthening capacity-building; and improving cooperation and coordination relating to maritime security.[265]

C. Emerging issues

1. Marine genetic resources

327. Oceans provide a large reservoir of unique organisms with great potential not only for the development of products of benefit to human society but also to increase our knowledge and understanding of the Earth's ecosystems and the history of life on Earth. Marine organisms, including genes, play a key role in the ecosystem services provided by the oceans. For example, planktonic marine microalgae contribute between 80 to 90 per cent to the ocean's productivity both in terms of carbon assimilation and oxygen generation. As key players in the nutrient cycle, where they act as decomposers, marine micro-organisms also play an essential role in degrading toxins and other pollutants of both natural and human origin. They are also essential to the maintenance of marine biodiversity as genetic diversity provides a mechanism for populations to adapt to their ever-changing environment. There is therefore a delicate interdependence between biological and genetic diversity. Marine micro-organisms, which are being used in a wide range of sectors and applications, including health care, nutrition, aquaculture, bioremediation, and industry, also offer great promises for the development of products to cure diseases such as cancer, create cleaner and cost-effective technologies and industrial processes and, more generally, improve human well-being.[266]

328. At the World Summit in 2002, States committed, inter alia, to negotiating, within the framework of the Convention on Biological Diversity, an international regime to promote and safeguard the fair and equitable sharing of benefits arising out of the utilization of genetic resources. They also encouraged successful conclusion of existing processes under the auspices of the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore of WIPO, and in the ad hoc open-ended working group on article 8 (j) and related provisions of the Convention on Biological Diversity. They further committed to promoting practicable measures for access to the results and benefits arising from biotechnologies based upon genetic resources, in accordance with articles 15 and 19 of the Convention on Biological Diversity, including through enhanced scientific and technical cooperation on biotechnology and biosafety, including the exchange of experts, training human resources and developing research-oriented institutional capacities.[267]

329. The importance of marine genetic resources to sustainable development has been highlighted in previous reports of the Secretary-General (see, in particular, A/60/63/Add.1, A/62/66, A/62/66/Add.2 and A/64/66/Add.2), at the eighth meeting of the Informal Consultative Process (see A/62/169), which focused its discussions on the topic, and at meetings of the Working Group (see A/61/65, A/63/79 and A/65/68). Based on discussions at those meetings, the General Assembly has

[265] Resolution 65/37, paras. 86, 89, 97, 98, 101, 105 and 117-119.

[266] A/62/66, paras. 157-168.

[267] Johannesburg Plan of Implementation (see note 9 above), para. 44 (o), (p) and (q).

continuously recognized, in its annual resolutions since 2007 on oceans and the law of the sea, the abundance and diversity of marine genetic resources and their value in terms of the benefits, goods and services they can provide, and the importance of research on marine genetic resources for the purpose of enhancing the scientific understanding, potential use and application, and enhanced management of marine ecosystems.[268]

330. A number of forums, within their respective mandates, are considering the topic of genetic resources. Besides the General Assembly and its subsidiary bodies, they include the Convention on Biological Diversity, FAO, through its Commission on Genetic Resources for Food and Agriculture, and WIPO, through its Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore. The United Nations University Institute of Advanced Studies, including in cooperation with UNESCO, has sought to inform the policy discussions by the publication of reports on that issue and a web-based information resource on bioprospecting.[269] The annual reports of the Secretary-General continue to provide information on developments within those forums.

331. The issue of marine genetic resources is not only an emerging issue, having started to be considered by various forums relatively recently, but it also presents a number of challenges, in particular as regards marine genetic resources beyond areas of national jurisdiction. Those challenges are of a scientific, technical, environmental and legal nature. For example, it is generally thought that much still remains to be discovered and understood regarding the functions and role of marine genetic resources in ecological processes. Further marine scientific research is therefore needed. Capacity to sample, analyse and exploit genetic resources, albeit expanding, including in the developing world, is still largely the privilege of a few States and research institutions. Capacity-building and/or development is therefore also required both in terms of human resources and equipment and infrastructure. Limited availability of information on the sampling effort, including the location and purpose of such sampling, is also a challenging factor that impedes informed decision-making, as is the lack of information on the terms of public-private partnerships. A number of studies have been proposed, but still to be undertaken, to facilitate consideration by States of the issue of marine genetic resources beyond areas of national jurisdiction; they are set out in the outcomes of the Working Group (A/61/65, A/63/79 and A/65/68).

332. The legal regime for marine genetic resources beyond areas of national jurisdiction continues to be the subject of different views. The General Assembly has consistently noted the discussion on the relevant legal regime on marine genetic resources in areas beyond national jurisdiction in accordance with the Convention, and called upon States to further consider that issue in the context of the mandate of the Working Group, taking into account the views of States on Parts VII and IX of the Convention, with the view to making further progress on the issue.[270]

[268] See resolutions 62/215, 63/311, 64/71 and 65/37.

[269] See www.bioprospector.org/bioprospector/.

[270] Resolution 65/37, para. 165. See also A/62/66, paras. 188-233. For the different views held on the applicable legal regime, see A/62/66/Add.2, paras. 275-277; A/61/65; A/63/79 and A/65/68.

2. Coral reefs management

333. Agenda 21, in its paragraph 17.86, recognized the need to identify and protect marine ecosystems exhibiting high levels of biodiversity and productivity, such as coral reefs ecosystems. Further to that, the Johannesburg Plan of Implementation, in its paragraph 32 (d), called for the development of national, regional and international programmes for halting the loss of marine biodiversity, including in coral reefs. In its paragraph 32 (e), it also called for the implementation of the programme of action by the International Coral Reef Initiative[271] to strengthen joint management plans and international networking for wetland ecosystems in coastal zones, including coral reefs.

334. A recent study[272] found that approximately 75 per cent of the world's coral reefs are rated as threatened from either local threats or the effects of climate change. Agenda 21 accorded a high priority for protection to coral reefs and associated systems; however, there are an estimated 2,679 coral reef protected areas worldwide, which constitutes approximately 27 per cent of the world's coral reefs. It is important to add that it is widely agreed that not all marine protected areas are effective in reducing human threats or impacts to coral reefs. High concentrations of carbon dioxide, thermal stress and the rising acidity of oceans[273] add another important dimension to the challenge since, unlike other threats, damage to reefs from climate change cannot be prevented by any direct management intervention. In that sense, the General Assembly, by its resolution 65/37, has encouraged States to improve management strategies for reefs to support their natural resilience and enhance their ability to withstand pressures, such as ocean acidification.

335. By the same resolution, the General Assembly has also emphasized the need to mainstream sustainable coral reef management into national development strategies and the activities of relevant United Nations agencies and programmes, international financial institutions and the donor community. In that context, several organizations have dealt with coral reefs within their respective mandates, such as the secretariats of the Convention on Biological Diversity, the CITES and the Ramsar Convention. The challenge from Agenda 21, the Johannesburg Plan of Implementation and relevant resolutions of the General Assembly remains the use of integrated coastal planning focused on sustainable development and area-based management tools for the protection of coral reefs worldwide.

336. A number of organizations have addressed coral reefs management in the context of their respective mandates. For example, the Conference of the Parties to the Convention on Biological Diversity by its decision VII/5, adopted an elaborated programme of work on marine and coastal biodiversity that included a list of suggested activities to address physical degradation and destruction of coral reefs, including a workplan on coral bleaching. Under the Convention on International Trade in Endangered Species, 2,019 species of corals have been listed on Appendix II of the Convention, which records species that are not necessarily threatened with extinction but that may become so unless trade is closely controlled. The work of the International Coral Reef Initiative, in the context of its Framework for Action[274]

[271] See www.icriforum.org/sites/default/files/call_action.pdf.
[272] Lauretta Burke et al., *Reefs at Risk Revisited* (Washington, D.C., 2011).
[273] WMO, *Climate Carbon and Coral Reefs* (Geneva, 2010).
[274] See www.icriforum.org/sites/default/files/framework_action.pdf.

and Renewed Call to Action,[275] has provided the basis for the conduct of regional workshops to define regional needs and priorities and to catalyse the development of national coral reef initiatives.

337. To date, according to *Reefs at Risk Revised* (see para. 334), there are an estimated 2,679 coral reef protected areas worldwide, covering approximately 27 per cent of the world's coral reefs. However, challenges remain in the effective protection and sustainable management of corals. For example, as a result of various factors, including lack of enforcement of the management framework, not all marine protected areas are effective in reducing human threats or impacts to coral reefs, such as watershed pollution, marine pollution and destructive fishing practices.

338. According to *Climate Carbon and Coral Reefs* (see para. 334), high concentrations of carbon dioxide, thermal stress and increasing ocean acidification add another important dimension to the challenge of protecting coral reefs worldwide. Unlike other pressures caused by human activities, damage to reefs from climate change cannot be prevented by any direct management intervention, as their effects are not caused by a direct action onto a specific reef but by the cumulative effect of global activities such as greenhouse emissions.

339. In order to sustainably manage coral reefs worldwide, closer attention could therefore be paid to strengthening the capacity to implement integrated management and ecosystem approaches to address the cumulative impacts of human activities and natural events and strengthen enforcement capacity.

3. Marine debris

340. Marine debris is both a symptom of unsustainable development practices and a challenge for achieving sustainable development. Its presence in the oceans is a result of anthropogenic activities, both on land and at sea. Sources of marine litter include waste; industrial outfalls; discharge from storm water drains; untreated municipal sewage; litter from beaches and coastal recreation areas; tourism; fishing and shipping; offshore mining and extraction; legal and illegal dumping at sea; abandoned, lost or otherwise discarded fishing gear; and natural disasters.[276]

341. Every year, marine debris results in substantial economic costs and losses to individuals and communities around the world. The possible effects include interference with shipping; danger to human health and safety; habitat destruction, impacts on aesthetics and tourism, and effects on wildlife. Pieces of litter are also potential carriers of invasive species between seas. Mostly, marine debris consists of material that degrades slowly and can therefore accumulate over time. Plastic debris in particular has recently been highlighted by UNEP as an emerging environmental issue, as a result of its potential to release persistent bioaccumulating and toxic compounds and its slow rate of degradation in the marine environment, which has been estimated in the region of hundreds of years.[277] Particular attention also continues to be drawn to the effects of abandoned, lost or otherwise discarded fishing gear, particularly as a result of its ability to continue to fish (often referred to as "ghost fishing") as well as its potential to become a navigational hazard at sea.[278]

[275] See www.icriforum.org/sites/default/files/renewed_call_to_action.pdf.
[276] UNEP, *Marine Litter: A Global Challenge* (Nairobi, 2009).
[277] UNEP, Yearbook 2011, available from www.unep.org/yearbook/2011/.
[278] FAO, *State of World Fisheries and Aquaculture 2010* (Rome, 2010), pp. 126-133.

342. Recently, attention has been drawn to high levels of accumulation of plastics and other marine debris in high seas convergence zones, also known as "ocean gyres". Deep-water canyons also appeared to be depositories for such material.[279]

343. Marine debris is addressed both as part of the international community's response to land-based sources of pollution and as sea-based sources of pollution (see sect. III, C, 3). In addition, there are a number of initiatives at the global, regional and national levels that specifically address marine debris. For example, UNEP's Global Initiative on Marine Litter fosters the establishment of partnerships and cooperation and the coordination of activities for the control and sustainable management of marine litter. At the regional level, the Regional Seas Programmes have initiated a number of activities aimed at addressing marine debris.[280] At the Fifth International Marine Debris Conference,[281] participants refined and endorsed by acclamation the Honolulu Commitment, which outlines 12 actions to reduce marine debris. Participants and a group of rapporteurs also worked to revise the Honolulu Strategy, a global framework strategy to prevent, reduce and manage marine debris. Other recent developments to address marine debris have been highlighted in earlier reports of the Secretary-General.[282]

344. Despite those efforts, in 2009, UNEP concluded that "there is an increasingly urgent need to tackle that issue through better enforcement of national regulatory systems, expanded outreach and educational campaigns at national, regional and global levels and the employment of strong economic instruments and incentives".[283] The General Assembly, in paragraph 137 of resolution 65/37, urged "States to integrate the issue of marine debris into national strategies dealing with waste management in the coastal zone, ports and maritime industries, [...], and to encourage the development of appropriate economic incentives to address this issue, [...] support for measures to prevent, reduce and control pollution from any source, including land-based sources, [...] and encourage[d] States to cooperate regionally and subregionally to identify potential sources and coastal and oceanic locations where marine debris aggregates, and to develop and implement joint prevention and recovery programmes for marine debris".

4. Nutrient over-enrichment and eutrophication

345. According to a 2010 study by the Global Partnership on Nutrient Management,[284] "[t]he international community is faced with a nutrient management challenge — how to reduce the amount of excess nutrients in the global environment, but in a way that maximizes the contribution of nutrient management to global development, food security and a low carbon society".

346. Excess nutrients, such as nitrogen and phosphorous, released or carried into the marine environment, can cause substantial harm by provoking the degradation of habitats and damage to marine ecosystems. In severe cases, nutrient over-

[279] UNEP, *Marine Litter: A Global Challenge* (Nairobi, 2009), pp. 21-23.

[280] Ibid., pp. 15-24.

[281] See www.5imdc.org.

[282] A/63/63/Add.1, para. 229 and A/64/66, paras. 104-106. A/64/62/Add.2, paras. 93-94. See also www.unep.org/regionalseas/marinelitter/publications/default.asp.

[283] UNEP, *Marine Litter: A Global Challenge* (Nairobi, 2009), p. 215.

[284] Global Partnership on Nutrient Management, *Building the foundations for sustainable nutrient management* (UNEP, 2010).

enrichment can cause toxic algal blooms, severe oxygen depletion from the decomposition of excess organic matter, eutrophication and the creation of "dead zones" (areas of oxygen deprivation devoid of life). In 2006, UNEP estimated that there were 146 coastal dead zones, and that the number had doubled every decade since the 1960s.[285] According to the 2010 study by the Global Partnership on Nutrient Management, 415 eutrophic and hypoxic coastal systems have been identified worldwide, including 169 identified hypoxic areas, 233 areas of concern and 13 systems in recovery. More than 90 per cent of the world's fisheries depend in one way or another on estuarine and near-shore habitats and many of these habitats are vulnerable to the harmful effects of eutrophication and toxic algal blooms.

347. The study reports that excess nitrogen and phosphorus can come from a variety of primarily land-based sources, including agricultural run-off from fertilizers, atmospheric releases from fossil fuel combustion, sewage and industrial discharges. Some two thirds of the 120 million tons of nitrogen produced by human activities makes its way into the air, inland waterways and the coastal zone, exceeding all natural inputs. Some 20 million tons of phosphorous are mined every year and nearly half enters the world's oceans — eight times the natural rate of input. In developing countries, an estimated 90 per cent of wastewater, a major source of excess nutrients, harmful to health and ecosystems, is discharged as untreated into waterways and coastal areas. Moreover, according to IOC in its document IOC/INF-1249, nutrient inputs to watersheds associated with agriculture, sewage and fossil fuel combustion are projected to more than double by 2050 unless technological advances and policy changes are implemented.

348. The document also reports that increased scientific understanding of the relationships between nutrient sources throughout watersheds, nutrient transport by rivers to coastal systems and the effects of that nutrient loading on the receiving coastal ecosystem is therefore critical to effective and integrated management of water resources and coastal zones. Ultimately, improved regulation of such pollution at its source-points would reduce its impact on the oceans. Nutrients are one of the categories of pollutants specifically addressed by the Global Programme of Action (see para. 160). Thus, UNEP, its Regional Seas Programme, and others are engaged in activities to address nutrient over-enrichment and eutrophication. IOC also addresses that issue, including through its programme on Harmful Algal Blooms.[286] Page 4 of the Global Partnership on Nutrient Management study describes how it was established in 2009 to bring together Government policymakers, scientists, private sector, non-governmental organizations and United Nations agencies, with a view to communicating the nutrient management challenge and helping to build constituencies of interest and action on the issue.

5. Geo-engineering

349. Geo-engineering is an emerging umbrella issue that incorporates a number of important developing activities. Geo-engineering is at such a nascent stage that its precise definition, or the scope of activities that may be considered to be geo-engineering, continues to be deliberated upon. Generally, geo-engineering is the

[285] UNEP, *The State of the Marine Environment: Trends and Processes* (2006), pp. 18-19.

[286] See www.ioc-unesco.org/hab/.

deliberate, large-scale alteration of the global climate system with the goal of mitigating the impacts of climate change.[287]

350. UNESCO convened an international expert meeting on 12 November 2010 on geo-engineering science and associated governance issues which recommended two broad categories of activities: (a) solar geo-engineering, which refers to interventions that reduce the amount of solar radiation absorbed by the Earth's climate system; and (b) carbon geo-engineering, which refers to the active removal of carbon dioxide from the atmosphere through engineered carbon dioxide scrubbers, or the enhancement of ecosystem processes.[288] The current understanding of the Convention on Biological Diversity mirrors that definition by referring to any technology that deliberately reduces solar insolation or increases carbon sequestration from the atmosphere, on a large scale, as a form of geo-engineering.[289] A document summarizing geo-engineering schemes has also been produced under the London Convention and its Protocol.[290]

351. Geo-engineering activities are seen as controversial and in need of legitimate scientific research owing to a lack of information regarding the effectiveness, possible benefits and potential undesirable impacts of individual activities.[291] Moreover, the science and governance of many geo-engineering activities is also poorly understood.[292] Consequently, the Conference of the Parties to the Convention on Biological Diversity decided, by decision X/33 of its tenth Conference of the Parties, to guide Parties and other Governments not to engage in geo-engineering activities that may affect biodiversity until there is an adequate scientific basis on which to justify such activities and appropriate consideration of the associated risks for the environment and biodiversity and associated social, economic and cultural impacts, with the exception of small-scale scientific research studies that would be conducted in a controlled setting and only if they are justified by the need to gather specific scientific data and are subject to a thorough prior assessment of the potential impacts on the environment.

352. There is a broad range of activities which may be considered to be in the realm of geo-engineering, and similarly there is no agreement on any such list, however ocean fertilization (see para. 202) is generally considered to involve such an activity.[293] A study on other potential geo-engineering activities is contained in the UNEP 2009 Climate Change Compendium, which includes a number of highly conceptual activities.[294] With regard to types of marine geo-engineering, IMO, for the purposes of the London Convention and Protocol, has classified two types: those involving the deposit of wastes or other matter into the ocean, and those involving the deposit of structures or devices into the ocean (IMO document LC 32/4, paras. 5-7).

[287] IOC contribution.

[288] See www.unesco.org/new/en/natural-sciences/environment/earth-sciences/single-view-earth/news/geoengineering_the_way_forward.

[289] Decision X/33, footnote 76, available from www.cbd.int/decision/cop/?id=12299.

[290] IMO document LC 32/4.

[291] IOC contribution.

[292] Ibid.

[293] IOC contribution.

[294] See www.unep.org/compendium2009.

353. Individual geo-engineering activities, or aspects of them, are already being regulated by, or subject to discussions in, relevant organizations (see General Assembly resolution 63/111, paras. 115-116). Concerns have recently been expressed over gaps in the current regulatory framework and the Conference of the Parties to the Convention on Biological Diversity, by its decision X/33, is undertaking a study on gaps in existing regulatory mechanisms of relevance to the Convention on Biological Diversity. The existing technological and scientific challenges in geo-engineering activities have been recommended by the UNESCO expert meeting to be addressed through an international research programme created for that purpose.[295]

6. Ocean noise

354. Ocean noise involves the introduction of sound generated by various human activities, including commercial and non-commercial shipping, air guns used to carry out seismic surveys, sonar, underwater detonations and construction and resource extraction into the sea.[296] Over the last 15 years, research has indicated that such noise has been affecting numerous species of marine mammals and fish, which depend on hearing for communicating and accomplishing other functions vital to their survival and reproduction. Impacts from ocean noise include mortalities, injuries, temporary and permanent hearing loss, disruptions in essential activities, habitat abandonment and loss of biodiversity, chronic stress, the masking of biologically important sounds and alterations in the behaviour of commercially harvested fish.[297]

355. Although recognized as a form of pollution, ocean noise is not yet fully addressed at the international level. Recently, however, the international community has begun to recognize the threat that ocean noise poses to marine biodiversity, encouraged further research and studies to better understand and minimize the impacts of ocean noise on marine living resources and on fishing catch rates, and begun to develop intergovernmental approaches to reducing its impacts.[298]

356. Various intergovernmental organizations recognize ocean noise as an increasingly important threat to biological diversity and the sustainability of marine living resources. There have been continuing calls for research, monitoring and efforts to minimize the risk of adverse effects of ocean noise.[299] The General Assembly has addressed ocean noise through its annual resolutions on the law of the sea (for example, 63/111, 64/71 and 65/37) and, most recently, fisheries (65/38), urging States and intergovernmental organizations to carry out and submit studies to

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[295] IOC contribution.

[296] See A/64/66/Add.2, para. 95.

[297] See, for example, Report of the International Whaling Commission Scientific Committee, IWC/56/REP1; see also OSPAR Commission, *Overview of the impacts of anthropogenic underwater sound in the marine environment* (2009).

[298] See A/59/62/Add.1, para. 220; A/60/63/Add.1, para. 159; A/62/66/Add.2, paras. 51-54; and A/64/66/Add.2, para. 96.

[299] See A/62/66/Add.1, paras. 190-195; A/64/66/Add.2, paras. 96-97; Report of the International Whaling Commission Scientific Committee, IWC/62/REP1; IMO document IMO/MEPC/58/23, paras. 19.1-19.5; resolution 4.17 of the Parties to ACCOBAMS; resolutions 2 and 3 of the Parties to ASCOBANS; and OSPAR Commission, *Assessment of impacts of offshore oil and gas activities in the North-East Atlantic* (2009).

the Division. The Division has compiled peer-reviewed scientific studies received from both Member States and intergovernmental organizations.[300]

357. Other organizations addressing ocean noise include the Convention on Biological Diversity, the Convention on Migratory Species of Wild Animals, FAO, IMO and the International Whaling Commission at the global level, and the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Neighbouring Atlantic Area (ACCOBAMS) and the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) and the Commission for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Commission) at the regional level.[301] In the context of their work, it has been noted that ocean noise levels have risen in recent years and could continue to rise owing to shipping, resource extraction and other offshore activities.[302]

358. One of the challenges in addressing ocean noise results from the fact that noise has a long range and is transboundary in nature and that some impacted species are migratory. Identifying the specific source of noise also presents difficulties.

359. Fully understanding and addressing the cumulative impacts of sectoral activities would benefit from enhanced cross-sectoral coordination and cooperation.

7. Renewable energy

360. Energy is central to all levels of sustainable development and poverty reduction efforts, having a direct bearing on social, economic and environmental development. None of the Millennium Development Goals can be reached without a corresponding improvement in the quality and quantity of energy services in developing countries.[303] As the Secretary-General remarked during the Fourth World Future Energy Summit, held in Abu Dhabi in January 2011, the "challenge is transformation [...] a global clean energy revolution [...] That is essential for minimizing climate risks, for reducing poverty and improving global health, for empowering women and meeting the Millennium Development Goals, for global economic growth, peace and security, and the health of the planet".

361. Although still relatively untapped, the oceans represent an increasingly viable source of renewable marine energy resources through, inter alia, wave, tidal, thermal and wind.[304] The renewable energy sector, in partnership with Governments

[300] Available from www.un.org/depts/los/general_assembly/noise/noise.htm.

[301] See Convention on Migratory Species of Wild Animals resolution 9.19; Convention on Biological Diversity decision X/13; Report of the International Whaling Commission Scientific Committee, IWC/62/REP1; Report of the Marine Environment Protection Committee on its fifty-eighth session, IMO/MEPC/58/23, paras. 19.1-19.5; resolution 4.17 of the Parties to the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Neighbouring Atlantic Area; resolutions 2 and 3 of the Parties to the Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas; and OSPAR Commission, *Assessment of impacts of offshore oil and gas activities in the North-East Atlantic* (2009).

[302] See Reports of the International Whaling Commission Scientific Committee, IWC/56/REP1 and IWC/62/REP1; and OSPAR Commission, *Comprehensive Atmospheric Monitoring Programme: Deposition of air pollutants around the North Sea and the North-East Atlantic* (2009).

[303] See www.undp.org/energy/ and www.undp.org/energy/andenvironment/sustainabledifference/PDFs/SustainableDiffIntro.pdf.

[304] Official Journal of the European Union, L 140/27, 5.6.2009, available from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF.

and research institutions, is increasingly addressing the technological and financial barriers to deployment of full-scale devices installed and operating in the oceans.[305] While potentially providing renewable sources of energy, the deployment of these technologies into the marine environment may also lead to significant use conflicts and environmental harm.[306]

362. In order to ensure that renewable marine energy resources contribute positively to the global clean energy revolution necessary to power sustainable development, States and the international community will need to address the significant gaps in ecological knowledge and erect the necessary regulatory frameworks at all levels.[307] The Informal Consultative Process will consider marine renewable energy as the topic of focus at its thirteenth meeting in 2012.

8. Environmental data exchange

363. There are many international organizations, Governments, universities and institutions that offer oceanographic data and information free of charge. It has been noted, however, that the activity is not systematic and is at the discretion of each data holder.[308] The call for the free exchange of oceanographic data, in particular environmental research, including on climate change, is driven by current environmental challenges and the need to understand and address those challenges.

364. To address the deficiency in data sharing, there have been calls for the urgent establishment of a system under a convention or other formal treaty to facilitate and oblige data holders to freely exchange data for scientific programmes and for data prevention.[309]

V. Conclusions

365. Agenda 21 and the Johannesburg Plan of Implementation helped set important goals and targets for the sustainable development of the oceans and their resources, which, inter alia, have provided direction for initiatives in the field of oceans and the law of the sea over the past 19 years. Considerable progress has been achieved, particularly in the development of legal and policy frameworks, institutions and cooperation mechanisms. However, the full implementation of many of those goals and targets will require further efforts by States, intergovernmental organizations and other relevant actors.

366. The present report demonstrates that a number of milestones have been reached in the marine sector in terms of policy and institutional developments for the sustainable development of oceans and seas. The Convention provides the legal framework for all activities in the oceans with near-universal participation. Two

[305] European Ocean Energy Association, *Oceans of Energy, European Ocean Energy Roadmap 2010-2050* (2010). See also www.innovateuk.org/_assets/pdf/press-releases/press%20release%20wave%20and%20tidal%20stream%20et%2027jan11%20final.pdf.

[306] See Mark A. Shields et al., *Marine renewable energy: The ecological implications of altering the hydrodynamics of the marine environment* (2011) and Richard Inger et al., *Marine renewable energy: potential benefits to biodiversity? An urgent call for research* (2009).

[307] Alain Pigeonat, *Renewable Marine Energies: Legal Approach in International Law and Comparative Law* (2009).

[308] IOC contribution.

[309] Ibid.

important implementing agreements have been adopted and brought into force. The development of legal and policy frameworks and relevant implementing institutions has been a promising achievement across most, if not all, major sectors.

367. Competent international organizations have undertaken a large number of activities at the global, regional and national levels. Programmes have also been put in place to promote cooperation and coordination among States and build capacity. Technical assistance is being provided to developing States through those programmes and growing consideration is being given to the special case of small island developing States. Mechanisms of cooperation and coordination such as UN-Oceans are also contributing to an integrated overview of developments in the oceans and seas.

368. Yet, despite the efforts undertaken by the international community thus far, the negative impacts of human activities on the oceans and seas are increasingly visible. Marine pollution and unsustainable resource exploitation practices continue to endanger marine ecosystems, thereby putting at risk the potential benefits for future generations. Climate change has emerged as an important factor on many different levels, by contributing to such phenomena as ocean acidification, sea level rise and coral bleaching. It is also difficult to ignore the increase in devastating natural disasters, as recently evidenced by the tragic earthquake and tsunami in Japan, which have claimed thousands of lives and severely affected millions of others, in particular in coastal communities. Developing countries, including small island developing States in particular, are still facing the challenge of implementing and fully participating in the benefits and opportunities linked with the oceans and seas.

369. Moreover, sustainable development requires, inter alia, that the adverse impacts on the quality of air, water and other natural elements be minimized so as to sustain the ecosystem's overall integrity.[310] Marine areas beyond national jurisdiction need to be carefully managed and monitored for their health and wealth in natural resources and rich biodiversity. Such efforts could be assisted with the prompt operationalization of the regular process for global reporting and assessment of the state of the marine environment, including socio-economic aspects. That process would provide a much-needed baseline of the state of the marine environment to better inform decision-making. It is also quite clear that the ocean resources are not inexhaustible and efforts in addressing consumption patterns should also be part of the commitments of the international community for the sustainability of oceans and seas.

370. Efforts should be made to facilitate implementation of the outcomes of the major summits on sustainable development at the global, regional and especially the national level. That would require increased international and inter-agency cooperation and coordination, as well as continued efforts to build necessary capacity. Political will and the targeted allocation of sufficient resources at all levels remain key components of the way forward.

371. Today, the oceans continue to provide hope and opportunities for fostering sustainable development, poverty alleviation and the development of a "green economy". Fisheries continue to represent an important source of employment and to provide a valuable source of food for billions of people. The oceans have an extremely rich biodiversity, including marine genetic resources, which holds untold

[310] See A/42/427, part I, chap. 2, para. 14.

promise for possible applications in the industrial, pharmaceutical and therapeutic fields, among others. Recent discoveries and developments in science and technology have pushed the boundaries of our knowledge of the oceans' processes and ecosystems. Transport by sea continues to grow and thus commercial exchanges among States have increased, providing employment opportunities to numerous seafarers and contributing to the development of nations.

372. As on previous occasions, stated actions need to take place primarily at the national level, with Governments, non-governmental organizations, the private sector and others as the main actors. The role of the United Nations system is, inter alia, to facilitate cooperation among major actors to enhance action at the national level.[311]

[311] A/54/131-E/1999/75, para. 43; ACC/2000/8, para. 47.